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The Economic War Potential Of Asia

Lieutenant Commander Joseph Z. Reday, *United States Naval Reserve*

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IT IS just as easy now to overestimate the fighting strength of the Orient as it once was to belittle it. We could not whip Japan on any Wednesday afternoon, as our more optimistic citizens thought we could. It took us nearly 4 years of war to do it. We now run the danger of swinging too far the other way and accepting the manifest willingness of thousands of Orientals to die in battle as an indication of overwhelming military strength on their part.

A readiness to advance into fairly certain death is, of course, an important feature of war potential. No nation could win a war without it. Modern wars, however, are fought with commodities as well as men, and commodities, by and large, are more difficult to obtain and harder to get

to the front. With the possible exception of little Paraguay in the Gran Chaco War, no country in modern times has ever lost a war for lack of men to do battle. Whatever the commentary on our civilization, men are the only completely expendable items thrown into war.

Manpower

Asia thus possesses in her inexhaustible population only one element of what it takes to fight a war—and that an element which has never been decisive. Lest we become too impressed by the effect of manpower thrown at us in Korea by Communist China, let us consider the scope of this conflict. To meet their prodigious expenditure of manpower and stocked war materials, we have only seven less-than-full-strength divisions in Korea, plus perhaps an equivalent force of South Koreans.

Korea

While the fighting in Korea has, of course, ground up supplies and equipment, the consumption of the materials of war has been nothing compared with that of all-out war between major powers. The North Koreans fought largely with weapons provided ahead of time by the Soviets. The Chinese are using stocked weapons

If the Soviet and Chinese Communists sever the contact between Asia and the West, they will be forced to support or starve millions of people. Inexhaustible manpower can be a liability as well as an asset

mostly captured from the Nationalists. And we, for the most part, are using war materials left over from World War II. Nowhere has war production and supply and transport gone into high gear, and nowhere has real war potential been engaged.

If we had been pushed out of Korea, it would have indicated nothing in an assessment of our ability to survive in our world struggle with communism and the Soviet Union. For whether we are in Korea or out of it, our enemy is the world power controlled by the Soviets, and that power is little affected by whether we are at the Yalu River, the 38th Parallel, a perimeter around Pusan, or back in Japan.

The power of Communist Asia is important only as a potential contribution to all-out war in terms of what it takes to fight that kind of war. This means men, supplies, and fighting equipment, plus facilities for getting men and equipment to battle. It means coal and oil and steel and airplanes and guns and other products of industry. If Communist Asia can produce them, then that is power. If not, they must be supplied from the Soviet Union, and that is not power but weakness in Asia. In these terms, what of Asia?

Food and Fertilizer

The foremost consideration in the appraisal of the war strength of many nations is that of ability to feed the populations which crowd their borders. In this respect, Asia is the weakest area of the world, so much so that her manpower can easily become her greatest liability. While the Soviet Union and Communist China have managed to starve millions of their people without actual revolt, this necessity for mass starvation hardly constitutes a power potential.

Rice Economy

The Far East rice economy may be divided roughly into food surplus and food deficient areas. That of surplus is the

tropical and comparatively under-populated Southeast Asia where Indochina, Burma, and Siam can be counted on in normal years to produce above their own needs about 5½ to 6 million tons of rice for export to the food deficient countries.

This surplus of rice is subject, like all of Asiatic life, to the vagaries of man and the elements. The elements may be expected to average out over a period of years. Those of man, as for example the warfare in Indochina over the past 4 years, are less predictable but may be taken to handicap food production. From Indochina, by way of illustration, rice export in the postwar years has amounted to only some 10 percent of the prewar normal. Large-scale warfare would intensify this drop in production in all of the countries touched by it.

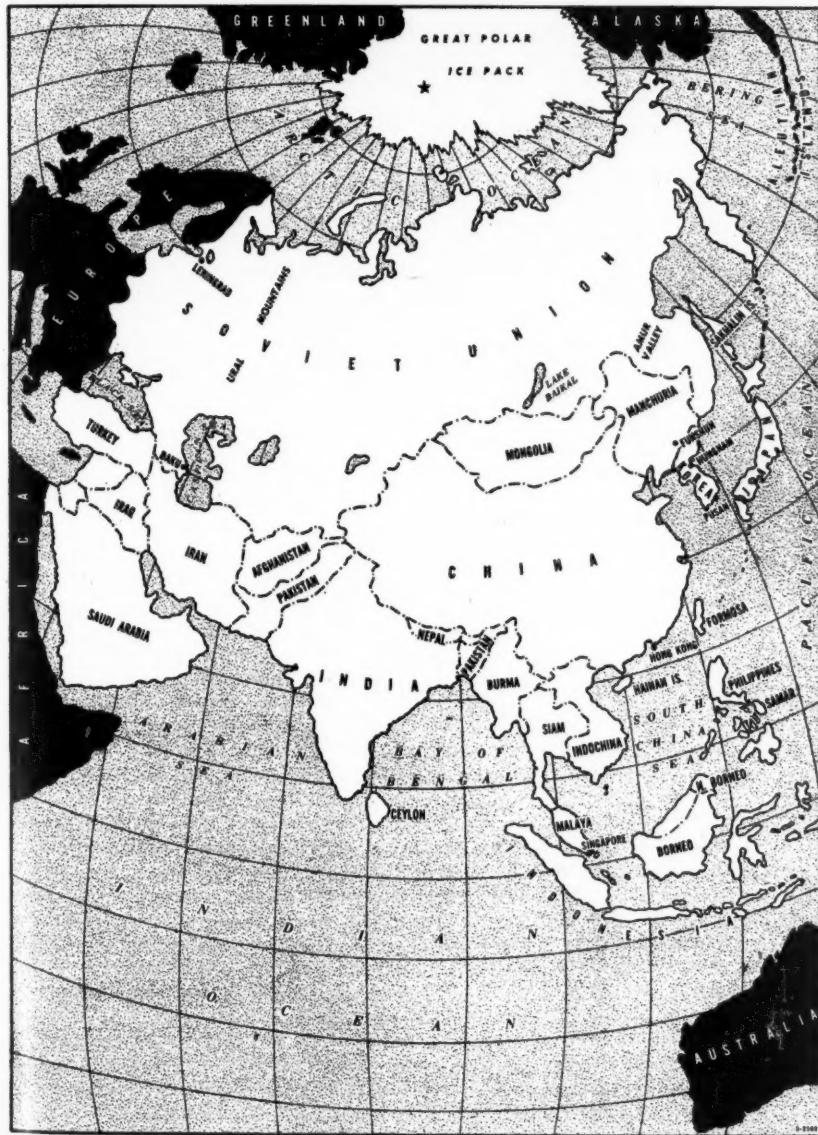
Korea's prewar export of a million tons of rice a year to Japan dwindled to a negative quantity at the end of the past war, and Korea has imported grain ever since. Present Korean food potential, far from allowing an export surplus, indicates widespread starvation at home. The pre-war surplus of millet and barley shipped from Manchuria to Korea likewise ended with the end of Japanese control. Manchuria may be supplying foodstuffs to the Soviets in Asia, but the volume is likely to be small.

Matching the Southeast Asia rice surplus is a bottomless pit of Asiatic food deficiency, from the periodic famine demands of China to the chronic import requirements of such potentially self-sufficient areas as the Philippines, Malaya, and the Indies. If Japan is considered a part of Asia in assessing the possible strength of that part of the world, her food import of about 1½ million tons a year must be added. Throwing in India's needs would give a grain import requirement of 6 to 6½ million tons a year for the deficiency areas as a whole.

This total rice and grain deficiency is

THE ECONOMIC WAR POTENTIAL OF ASIA

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compared with the potential rice surplus availability and finds the balance somewhat wanting. Formosa's prewar rice surplus, then exported to Japan, seems to have largely disappeared. The Far East does have a certain over-all food export potential, but in the form of sugar, tea, fruits, and other specialties which do little to solve the basic rice problem. Grain deficiencies during recent years have been met by United Nations Relief and Rehabilitation Administration and Economic Co-operation Administration shipments from the West.

Foodwise, therefore, Asia, which has no fat to fall back on, must go without in a long war, even under the optimum conditions which most of the normal figures presuppose. A good deal less than optimum conditions would almost immediately result from war and a cut down in fertilizer availability. Even in an Orient which makes large use of its own night soil for fertilizer, the drastic effect of reduced chemical fertilizer supply is evidenced by experience during the past war. Japanese and Korean crop return went down nearly a third as a direct consequence of a lack of chemical fertilizer, particularly ammonium sulphate for wet rice culture.

Without Japan, Asia would have almost no production capacity in chemical fertilizer. Japanese output averages perhaps $2\frac{1}{2}$ million tons a year in all types, but even in Japan, production depends upon imported potash, phosphate rock, and either petroleum coke or anthracite coal. Korea's large capacity was centralized in the modern chemical cluster at Hungnam, completely destroyed by bombing and shelling during the present conflict, along with the supporting facilities for producing sulphuric acid and other intermediates.

Even with Japanese production, the Orient ordinarily imports a total of more than half a million tons of chemical fertilizers each year from the United States and Europe. If we use a yardstick of be-

tween 1 and 2 tons of food production for each ton of fertilizer (quite conservative in view of the intensive cultivation methods of the Orient), war and the loss of this fertilizer import alone would mean a cutback in food production of about a million tons a year. This would be a serious weakening of the Asiatic war potential and the long-term willingness of Asia to fight. The inability of Asia to transport food, furthermore, has long been the reason for famine in local areas in spite of good crops elsewhere. This transport problem would be immediately magnified by war, particularly the transfer of rice from Southeast Asia to the large and hungry population centers.

Industrial Capacity

Lack of ability to produce the materials of war more than anything else thwarted Japan's course of empire. It remains an accentuated deficiency in Asia's war potential. Unless we include Japan and India, there is no industrial capacity of significance in the Far East, beyond the conjectural development of Soviet Siberia. And if we include Japan and India, the Oriental industrial picture remains one of unbalance and complete dependence upon a tying-together of scattered resources separated by thousands of miles of ocean.

China

China can produce perhaps enough homespun textiles to clothe her population after a fashion. Her home industry can also probably supply her starvation level needs in native consumer goods. And in Manchuria there is a remnant of Japanese-installed heavy industry, stripped to a large extent by the Soviets in 1945 and 1946. Manchuria retains an operable, though probably not operating, capacity of something like a million tons of steel a year, an undetermined ability to turn out machine products in the railway shops and arsenals built by the Japanese, and a scattered supporting industry capable of pro-

ducing some chemicals and some metal products of probably inferior quality.

Korea

Korea has a fairly large industry designed to do the primary extracting and refining of local mineral resources, and the production of metal ingot. The Korean industrial plant was not complete and not balanced. In few cases was any industrial process carried to the final product. Intermediates and semirefined materials were taken by the Japanese from Korea to Japan for final fabrication. The exception was the production of chemical fertilizer.

The only other manufacturing industry of consequence in Korea was the production of cotton textiles, with an annual peak output of 200 million yards pre-war, enough to supply perhaps half of the minimum needs of the 25 million Koreans. Korea had a respectable hydroelectric power generating installation in the north capable of producing about 2 million kilowatts. Its status after the fighting in that area is in doubt. At least 300,000 kilowatts of that capacity was removed by the Soviet Union in 1945 and 1946.

Korean postwar industrial recovery was slight, at best, and the present conflict would seem likely to have destroyed whatever remaining industrial potential Korea possessed. The bombing and shelling of the Hungnam area has wiped out the chemical center in that region. Other bombing has been directed at steel mills and shops used for railway repair and machine production. Concentration of bombing on the few industrial targets, and the bitter fighting which has covered the country since June 1950, must be considered to have reduced the industrial war potential of Korea to pretty much of a dead loss.

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Southeast Asia

Industrial installation in Southeast Asia is negligible. Though producing and smelting most of the world's tin, the in-

dustrial process has been limited to extraction and partial reduction of the ore. Little supporting industry has been developed beyond hand and small shop production of indigenous goods. The entire area is still in the primitive economic stage of exporting agricultural and forest products such as rice and rubber, or the basic mineral resources such as tin and petroleum from Burma, and, in return, importing industrial commodities. The large cities, including Hong Kong and Singapore, are exclusively commercial rather than manufacturing centers.

The islands off Southeast Asia, including the Netherlands Indies and the Philippines, are likewise producers of tropical agricultural products and minerals, and are without industrial capacity.

Japan

All of this east Asia and western Pacific region has for many years looked to Japan as the buyer of much of its exportable raw materials and the source of manufactured products. In Japan is the balanced industrial plant capable of turning out any product from telephones to major ships, and geared to the use of raw materials from overseas.

Japanese heavy industry reached a peak during the past war of about 8 million tons of steel a year and an installed machine tool inventory of something more than 1 million machines. With this 10 to 15 percent of United States steel availability, she was able to produce more than a million gross tons of shipping in her best year, and 25,000 airplanes. At peak, her mines produced more than 50 million tons of coal a year, about 10 percent of American output.

Over-all war damage to industry in Japan is estimated at roughly 30 percent, which at first consideration might indicate the retention of some 70 percent of the war-making ability of the past. This is definitely not so except in terms of basic and well-worn plant capacity. The

arsenals, producers of munitions and other primary war materials, have either been stripped of equipment or converted to other use, or both. The large aircraft industry has received similar treatment.

In basic industry, the Japanese are pretty much operating the same equipment with which they began the past war. It is old, has had poor maintenance, and has been too long idle or only partially operated. Technology is not advanced except in a few fields of Japanese specialty, as, for example, textiles. In combustion engineering, quality control of production, continual process regulation, tolerance in dimension, and other technical features of modern industry, Japan lags well behind the United States, Germany, and Great Britain.

In light industry, Japan shows to better advantage. Her cotton and woolen textile industry is large, modern, and abreast of the world technically. She can mass produce all of the consumer's goods, as, for example, light bulbs, bicycles, and hardware, cheaply and well. Japan has no automobile and truck industry approaching ours, but can produce what vehicles are required in the Orient. Her chemical industry is not up to ours but it is adequate.

India

While certainly not in any way allied to Communist power in the Far East, India is an Asiatic nation and should be considered in assessing the strength of that part of the world. In addition to Japan, India alone possesses an industrial installation, important because of the heavy industry development during the past war. Centered in the Tata Iron and Steel Company, India has a capacity of about $2\frac{1}{2}$ to 3 million tons of steel a year, with a reasonably well-balanced steel rolling and fabricating industry. The rest of Indian heavy industrial plant is roughly comparable with that steel production

figure, except for basic chemicals, in which her capacity is small.

With a huge primitive population, India has attempted since the war to develop a balanced light manufacturing industry. Her textile output is nearly sufficient at present to satisfy the country's poverty level market. In food processing and packing and the production of tools, hardware, small appliances, and equipment, India also is reasonably self-sufficient, but lacks capacity in the modern mass produced manufactures.

India's industrial development is limited by the need for productive ability in heavy power and industrial machinery, vehicles, and finished chemicals. Further installations, therefore, can progress only as capital goods can be imported and as capital to meet the cost can be found. The industrial strength of India, furthermore, is fully engaged in the mammoth task of supporting her very large and desperately poor population. Its contribution to the usable power of Asia would be slight.

Pakistan, the other dominion, has little or no industrial plant and is making strenuous efforts to install consumer facilities. The Indian principalities and Ceylon likewise have little industrial strength.

Imponderable Siberia

The imponderable in this appraisal of Asiatic industry is that of what the Soviet Union has accomplished in Siberia. Various reports have been circulated to the effect that large-scale and self-supporting industrial centers have been established there. This is likely to be very much exaggerated and seems based on the reports of inexpert refugee observers. The only usable yardsticks for gauging the extent of industrialization are the production and consumption of steel and other metals in the Soviet Empire as a whole, and the ability of Siberia to support the required population in terms of food production. This steel consumption

pattern indicates very little left over for Siberian development after the reported rehabilitation of Soviet European industry and the huge production of armaments. Grain production in the entire area east of the Urals amounted in 1913 to only 18 percent of total output. By 1945, that small production had only increased by about 25 percent. Such increase could only feed a fraction of the more numerous population required for any significant industrialization. The total population east of the Urals was reported in 1945 to be only 20 million, which leaves very few for the so-called industry of Siberia. Nor have any extensive new railway networks been firmly reported, particularly any expansion or duplication of the Trans-Siberian Railway which is the only connection with European Russia, and is presently totally unable to carry the goods necessary for an industrial Siberia.

Finally, the diversion of scarce commodities for the industrialization of Siberia would seem very much at variance with usual practice of the hard-headed Soviet planners. Development of a self-supporting industrial economy in a region so isolated and so brutally inhospitable would require a fantastic effort in terms of steel and machinery and fuel and transportation and food, all of which would provide far greater return if applied to European Russia and the Urals region. Acceptance of this fact would seem indicated by stated Soviet policy as expressed by the Soviet State Planning Commission in 1947 to the effect that restoration of productive capacity in the areas liberated from German invasion would receive first priority in postwar economic policy.

Capital investment in all of the Soviet east as reported by the Soviet State Planning Commission averaged, at the end of the war, only 23 percent higher than pre-war. Since the investment rate in the Urals region was 55 percent higher, the increased tempo in Siberia could not

have been great. There is no reason to believe that this disparity between regions has been changed. As of 1945, also, the Soviet Union, which usually exaggerates its attainments, reported an output for all of the USSR east of the Urals at only 1 1/4 million tons of rolled steel a year and a power capacity of only 1,860,000 kilowatts. For so great an area, this is a very small production base. The same report showed an increase in workers in Siberia as only about 10 percent greater at the end of the war than prewar. An increase so small can probably be wholly accounted for by political prisoners which does not indicate great progress in developing the region.

In summary, it seems likely that the major Soviet effort is being limited to the exploitation of mineral resources in Siberia, plus a modest steel production and small-scale semifabrication of metal products in the Amur Valley. Soviet industrial capacity in the Urals region, admittedly large, is of little consequence to the Far East some 4,000 miles away.

The industrial war-making potential of Asia, therefore, must be wrapped largely around the industrial capacity of Japan. Whether this capacity would be available to Communist Asia is, of course, an item of compelling importance, but one beyond the field of this article. To allow to this consideration of Asia and the Far East a maximum war potential, the capacity of Japan is included. Even with Japanese industrial plants, however, Asia suffers from an absolute shortage of mineral and other raw material resources which places an upper limit over even potential development.

Fuel and Metals

The basis for our entire industrial civilization, and particularly for the wars we fight, is the availability of fuel and metals. Coal, at least a portion of it of coking grade, and iron ore are present in the central and eastern portions of the

United States and are responsible for the economic strength of our country. They are found in the Ruhr region in Europe and likewise are responsible for the development of Western Europe. They are either present in the British Midlands or available from overseas. They are available in Central Russia, but neither so close together nor so easily moved as is American iron ore, which fortunately can be transported via the Great Lakes waterway.

Coal

In Asia, metallurgical grade coal and reasonably high-grade iron ore have not been found in conjunction in large volume, which perhaps is one reason for Asia's lag behind the West. Japan has ordinary grade coal, but only a small fraction of it can be coked. Japan also has iron ore in small quantities, but of a high sulphur and phosphorous content, which makes a poor steel unless mixed with better ores.

China has deposits of coking grade coal, the most important of these being in Fushun, in Manchuria. There also are deposits in Hopeh, and in Shansi and Shensi in the interior, and reported sources in Southeast China. Production potential with existing installation is possibly 35 million tons a year. Total reserves might be in the neighborhood of 250 billion tons of reasonably good quality, enough to support a fairly high degree of industrialization—if these reserves could be developed and if a transportation system were available. Much of the Chinese coal mining facilities have been badly used by civil war in that country. Mines have gone untimbered and have been allowed to flood over long periods. Chinese engineers have estimated a 5-year rehabilitation time for many of them.

Extensive deposits of coal are known to exist also in Siberia, and reports have been received continually of postwar development by the Soviets. This coal is claimed to be of good coking quality, which

is entirely possible. If so, it gives to Siberia a basis for a long-term industrial growth; but as pointed out before, the development of an industrial economy in this area would be a stupendous undertaking and seems well beyond Soviet resources in materials if not in men. The main Siberian coal deposit, for example, in the Kuznetsk Basin, publicized at 450 billion tons, is 1,200 miles from the nearest iron ore in the Urals. Coal and iron ore in the Amur Valley near the Pacific coast are sufficient for only very modest industrial development.

Iron

Manchurian iron ore is ordinary grade, while that of Hainan Island in the south is very high grade, but with a reserve of only 100 million tons. Total iron ore reserves of China (mostly about 35 percent iron) are estimated at 750 million tons—enough, if fully exploited, to run the United States steel industry for only 5 or 6 years. So much for the popular conception of untapped mineral wealth in that country.

Reasonably large deposits of iron ore are found in the Philippine Islands, principally in Samar, and fairly extensive deposits have been worked for many years in Malaya. Malayan iron ore is ordinary grade and has been developed to an output of about 2 million tons a year. India produces about 30 million tons of coal a year and 3 million tons of iron ore. Her reserves are not large enough to support a very much greater rate of consumption, and this establishes her heavy industrial potential as not too much beyond that already installed.

More important than iron ore would be India's 600,000 tons of manganese a year. Manganese deposits are also being worked in the area near Lake Baikal in Central Siberia. Like the stories of most of the resources of Siberia, the extent of this manganese deposit would seem exaggerated. Since the Soviet Union is al-

ready a large producer of manganese, its Siberian resources in any event do not appear to add much to over-all potential.

Petroleum

Petroleum resources of the Far East are centered mainly in the Netherlands Indies, Borneo, and Burma, with a small production in Sakhalin and Japan. The total production for the entire area averages about 85 million barrels a year, a little more than 4 percent of American output. Japan has very limited and technically unsatisfactory plant installations for producing synthetic oil from coal liquefaction.

While there may yet be found petroleum resources hitherto unsuspected, petroleum appears to be the major deficiency of the entire Orient, and one of its most glaring weaknesses in all-out war. The availability of oil, along with steel, is a gauge of the ability of warring nations to project mere manpower into effective fighting power. Under present military technology, it is the only means of utilizing fighting power in all of its forms and at any distance from the homeland. An absolute lack of oil in the Far East, therefore, means an absolute limit to the utilization of Oriental manpower.

Other Metals

In other minerals, Asia's supply is spotty. Most of the alloy metals can be provided, to the minimum extent necessary, by strenuous exploitation of existing resources. Copper would be barely adequate even counting Japanese resources. Bauxite is available at Bintan and Palau in the islands, and aluminum reduction facilities are probably adequate in Japan and Formosa. Japan, however, is the only country even potentially capable of actually building airframes or engines. The area as a whole would have enough lead and an excess of tungsten and crude tin.

Other Resources

Other natural resources would include a strangle hold on the world supply of natural rubber in Southeast Asia and the islands, ample vegetable oil supplies from copra and soy beans, and tung oil from China. Jute, hemp, and other specialized fibers are in long supply in the Far East, but cotton is obtainable in quantity only from Chinese local production and from Pakistan, while wool would be deficient if the Orient were cut off from Australian sources. Synthetic fibers would have to be manufactured in Japan, which has a large rayon industry, but would require sizable imports of salt from China and pulpwood probably from Soviet Asiatic sources.

The Over-All Balance Food

As an area, the Far East is not well supplied and can only be self-sufficient in food production based upon a diet of grains and fish and a normal hunger level with periodic famine in China. It can maintain even that hungry self-sufficiency over a long period only if enough chemical fertilizer can be manufactured and made available to the growing crops. The intensive agriculture of the Orient is not easily subject to increase per acre except in the tropical portion. As has been observed, Asiatic food supply is precariously dependent upon Japanese industry in the form of chemical fertilizer, and upon sea transportation for the movement of rice surplus from the southeast. Other vegetable and forest products, with the exception of cotton and wool, are relatively abundant.

To do more than feed their hungry millions, Asia and the Orient suffer from geologic and geographic weaknesses which, in the event of all-out war over a long period of time, would limit the potential of the area to a level well below its possibilities in manpower.

Petroleum

The first weakness is the low maximum potential in usable fuel. Based upon existing known resources, the Far East cannot produce enough petroleum to fight a major war; and what resources exist in both production and refining are located mostly in the exposed islands. The Asiatic portion of the geopoliticians' heartland, therefore, suffers the perhaps fatal handicap of depending upon the outlying areas for petroleum, the prime means of utilizing potential power in war.

This lack of petroleum in Asia is a cumulative weakness because it supplements a similar lack of petroleum in the Soviet and European area of the Eurasia land mass. Limited European petroleum resources in Rumania, Hungary, and Western Europe, while not fatal to Hitler, did constitute the greatest defect in the German war machine, just as the same deficiency finally halted the Japanese. The addition of Soviet Baku oil does only a little to change that picture.

All of which must turn Soviet thoughts of aggrandizement toward Iran, Iraq, and Arabia, and their inexhaustible pools of oil, which have a potential production at least 10 times that of all the Soviet resources. Practically the entire Middle East oil development is now in the hands of the United States and Britain, and it is reasonably certain that we would fight a full-scale war before giving it up to the Soviets. The art of destroying oil wells also has received intensive study of late years, which makes it improbable that the Soviets would be able to conquer any going addition to its petroleum supply.

Coal

Coupled with the low limit of oil availability is the general poverty of Asia in other fuels. Present coal production in the entire Far East is only about 20 percent of that in the United States. While estimated resources in coal are reasonably

great, they do not amount to more than a portion of the coal reserves of the United States alone, and are far less accessible and of poorer metallurgical quality. Their development, except for Japan, is primitive and in no way capable of supporting a war. Nor, unless Siberian resources are improbably great, would they support a modern industrial civilization for the crowded Orient, which is, in passing, a matter of profound significance to the world's political future.

Metals

Supplementing the lack of fuel is the equally important deficiency in metals which depend upon fuel. The over-all suspected resources in iron ore are probably less in total than those of, say, Latin America, and of not much greater development. Much of the iron ore, moreover, is not suitable for steel making except when it is improved by mixture with higher-grade ore brought in from outside. Finally, assuming peak tonnage of existing steel production facilities, there would be less than 25 pounds of steel per year per capita in the entire Far East, compared with about 1,300 pounds per American per year!

Land and People

Far from meeting the popular conception of undeveloped riches waiting only the magic wand of technology, Asia is actually poor in potential as well as in fact. A good half of all Asia is frozen for most of the year, and the remainder, the 2 million square miles or thereabouts of Mongolia and Sinkiang, is unusable wasteland supporting perhaps one person per square mile. The immense populations of temperate and tropical Asia reflect not a good earth, but an earth suitable for wet rice culture, and demanding much human labor, half starved or otherwise.

It is true that Orientals and other submerged peoples, as, for example, the Russians themselves, can take from their

economy a far greater percentage of commodities needed by war. To put it the other way, such peoples can retain for their own consumption far less than we. There is a limit, however, to what civilian self-denial can do for a war machine. Even a 100 percent diversion of steel to war purposes in Asia would provide only some 10 to 15 million tons a year, or not too much better than 10 percent of our steel availability. The necessity for diversion of steel and other basic materials to direct war production means also a gamble on a short war, because it forces curtailment of capital maintenance and expansion, which in the last analysis is the basis of industrial power. Whipping a poor economy into war quickly brings on a severe deterioration of potential—as happened to Japan in the past war and as would happen to all of Asia in the event of major warfare in the future.

The Transport Problem

It is essential reasoning in the Eurasian heartland thesis of geopolitics that the inner lines and massed potential of this heartland is superior in strength to the potential which can be mobilized by the outlying and so-called island areas of the world, including the Western Hemisphere.

While sea power has tended to disprove this theory in every war to date, it is pointed out that even if conceded, the Asiatic portion of the present Soviet Communist heartland possesses none of the strength of massed power and all of the geographic weaknesses of island power and scattered resources. At the height of conquest during the past war, Japan held all of east Asia and the South Pacific, plus large chunks of Asia proper. Her center of power, however, was Japan itself, a group of islands, and her empire foundered in the task of bringing the resources of empire to Japan for fabrication into the weapons of war. Continental Asia during this past war remained an inert

mass, its manpower mostly engaged in escaping starvation.

The position of Communist Asia is even worse. In the first place, Japan shows every evidence of wishing to remain outside the Iron Curtain. Although Japan and Japanese industry are indispensable to Soviet power in Asia, even if lost to communism, the strength Japan could add to Communist Asia would be far less than that of the Japan of 1941.

Japan

For Japan has now suffered from more than 10 years of war and postwar industrial stagnation. She is stripped of all surplus capital, her interempire organization has been dissolved for more than 5 years, her industry is ramshackle, her navy is at the bottom. And, finally, her merchant fleet, a mere fraction of that of 1941, would certainly not fall to the Soviets. It is still costing us nearly 200 million dollars a year to support Japan despite the earnest efforts of her hard-working population.

To mobilize the potential of the Far East, the Soviet Union and its satellites would have to carry out a program somewhat as follows:

First, bring Japan into the Communist orbit with an industrial plant intact and a technical and managerial staff willing and capable of operating it and expanding it into the production of primary war materials.

Second would be the necessity for lifting from overseas sources to Japan close to 5 million tons of iron ore each year, 4 to 5 million tons of coking coal, 30 million barrels of oil, nearly 2 million tons of salt, perhaps a million tons of wood pulp, another 500,000 tons of bauxite, 2 million tons of rice and sugar, 2 million bales of cotton, a million tons of phosphate rock, plus rubber, tin concentrates, wool, alloy metals or concentrates, and so on and on. These materials would have to come from as far west as India, south from Malaya,

Burma, and Indochina, and across North China and Manchuria. The commodities produced in Japan would, in turn, have to move overseas to wherever the Communist forces operated.

Japan could not do it in the past war. Her imports of iron ore from Asia, for example, dwindled from 400,000 tons a month in early 1943 to 37,000 tons a month at the end of 1944. Coal imports went from more than 5 million tons in 1940 to 250,000 tons in 1945. By July 1945, she had no oil and practically no steel or aluminum. It is no more likely, and as a matter of fact far less likely, that Soviet Asia could do the job—without ships, and without the means of protecting ships in the Pacific if she had them.

If Communist Asia cannot acquire, hold, and utilize Japan, then it must depend on mainland resources. This is the true geopolitics of the heartland using inner communications and the concentrated strength of the large land mass. Continental Asia, however, offers little strength except in continental defense. Such strength can be used against us only if we are persuaded to pit our manpower against theirs on the Asiatic mainland. The scanty resources of the area are scattered over thousands of miles, from Soviet development in Siberia in the far north, through interior China, across deserts and impassable mountains, to India on the one side and the food and tin and rubber and oil of Southeast Asia on the other. Asia's ability to mobilize these resources for a common effort is fantastically improbable; the ability to protect them against us or otherwise to aid the Soviet Union in its plan for world conquest is even more improbable.

Continental Asia

Inner communications in Asia, far from being a strategic advantage, would seem to hold nightmarish possibilities for anyone attempting to use them. From Singa-

pore to Leningrad, for example, is about 7,000 air miles, and at least twice that by a combination of rail and road travel. If the land trip could be made at all, it would probably take 2 or 3 months. The railroad systems of Asia are for the most part single-track affairs designed for short traffic between ports and the hinterland they serve. In all of China's 4½ million square miles, there are but 7,000 to 8,000 miles of railways. The only adequate rail lines are those from European Russia across Siberia to Vladivostock on the Pacific, and the Manchurian and Korean systems connecting the major Manchurian centers with Korea and the coast. Those in Korea will have been mangled beyond recognition by the time this is read, and those in Manchuria are within easy bombing range.

Asia's transportation problem is more than a mere lack of facilities. It derives from the fact that Asia is, in effect, two continents. The subcontinent of India is separated from China proper by the Tibetan plateau, a frozen wilderness more than 700 miles wide and 1,700 miles long. As a barrier, it is as effective as an ocean, much of it being above the snow line, and even the valleys being more suited to goats and yaks than humans. Similar mountain barriers extend down and across Southeast Asia.

Since there is no industry in China or Korea capable of logistic support of a war, the manpower of China would require equipment from the Soviet Union. Not only would military equipment be required, but also rails, rolling stock, machinery, vehicles, electrical equipment, and practically everything else beyond that needed for mud-hut, primitive existence. Entirely aside from the question of whether or not the Soviets engaged in all-out war could afford to act also as the arsenal and workshop of communism, there is the matter of getting those supplies to the user. True, the North Korean Army was well sup-

plied by the Soviets, but this represented a build-up over a period of years concentrated on a small group. To supply and maintain the fantastic day-to-day logistics for all-out war would far overtax any existing transportation system between the Soviet Union and Asia.

And to attempt the utilization of the raw materials of Asia by moving them to the Soviet Union would simply multiply the transportation burden many times. For while the logistics of any army in the field are heavy enough, the tonnage of raw materials and fuel required to produce the supplies and equipment is several times as great. There is no slightest possibility of moving such a material lift on any conceivable Asiatic transport system—even the backs of coolies.

Illustrating the complete inadequacy of Asiatic transportation, merely to move the rice surplus of Southeast Asia to the consuming centers of China would require more railway rolling stock than is available in all of Asia, even if railway connections existed—which they do not. The Trans-Siberian Railway is equally deficient for a wartime Europe to Asia lift. General Bradley in testifying before Congress estimated its capacity at 17,000 tons a day. By way of comparison, we are moving nearly twice that tonnage through the port of Pusan alone to support the small conflict in Korea.

New Installations

The possibility of installation of industry in Asia is, of course, a consideration. The Japanese dreamed of such development in Manchuria and presumably were as ruthless in executing it as the Soviets can be. Yet, while the Japanese extended an enormous amount of their scarce capital in Manchuria, in more than 10 years it had not reached a point where it could either support itself or contribute significantly to the war effort of Japan.

There is no record of the Japanese Kwantung Army or the present Chinese Communist Army using either weapons or other equipment completely made in Manchuria or elsewhere on the Asiatic mainland. There is, on the other hand, much evidence of the difficulty of the Japanese in Manchuria continuing any industrial processing at all after our sea war began to cut the water transportation lines between Japan and Manchuria.

Asia simply lacks too many materials, finds it too difficult to get at the materials available, and is still too primitive economically for anything more than existence except by contact with the Pacific and the West.

The building of a manufacturing industry there would presuppose the prior installation of a transportation system, electric power generating and distributing facilities, such other utilities as water and fuel, the development of mines and reduction works and refineries, the training of labor, and the availability of all of the thousand and one supporting commodities, intermediate products, parts, repair facilities, and so on. Industry, in short, is a tremendously complicated and interdependent cluster of allied activities. Even if the basic resources exist, industry does not happen overnight, no matter what price a dictatorship is willing to pay in human suffering. Asia is no exception, most particularly in view of its lack of even potential resources in many of the commodities needed.

If the Soviet and Chinese Communists are willing to sever the contact of Asia with the West, then they are reduced to supporting or starving many millions of people. In the world struggle for survival, they are leading from weakness rather than strength in Asia. And whatever further conquests they make in Asia add to weakness, not to strength.

The Impact of Guided Missiles On Ground Warfare

Major Nels A. Parson, Jr., Artillery

The views expressed in this article are the author's and are not necessarily those of the Department of the Army or the Command and General Staff College.—The Editor.

COULD the story of the Normandy invasion have been written as follows?

Prior to D-day, the Germans carefully located their guided-missile units to cover the long vulnerable coast line of Western Europe. The 1st *V-2* Division had one regiment located near Brussels and the other at Amiens. The 2d *V-2* Division was deployed in the area between Reims and Paris. The 155th and 156th *V-1* Regiments were in position northwest of Paris. All guided-missile units were well dispersed and camouflaged, and had an ample stock pile of missiles on hand.

When the allied command committed its forces at Utah and Omaha Beaches on the Normandy Peninsula, German guided-missile fire was initiated at once. The two *V-1* regiments concentrated on the beachhead. On shore targets, the 2,000-pound fragmentation and incendiary warheads were delivered 20 at a time, at 15 or 20 minute intervals. With a radial probable error of about 200 yards, the effect was devastating. Some *V-1* missiles were fired singly toward the invasion fleet. Automatic target seeking devices in the missile noses steered the weapons into ships with about one-third of the missiles securing direct hits. Docks, troop concentrations, and supply depots in the Portsmouth-Southampton area were the targets for the two *V-2* divisions. Many fires were started and casualties mounted into the thousands.

To counter the German weapons, all available aircraft were dispatched to ob-

literate the launching sites. The air attack was only partially successful for the Germans abandoned their positions and moved to alternate sites somewhat closer to their targets. By constant air patrolling over all possible areas from which the Germans might begin firing, the invaders managed to discourage all but harassing fire at night. The British and American forces continued their build-up on the beaches for another week.

An impending windstorm then struck the entire area halting almost all air and sea activity. At the same time, the Germans unleashed a counteroffensive on the beachhead, supported by heavy fire from all *V-1* and *V-2* units. With a hurricane at sea and their position untenable, the invasion force held out until 23 June, when small-arms ammunition was exhausted and nearly 50 percent of the troops were casualties. Between D-day and the time of the surrender, some 70,000 troops on shore were lost as prisoners or casualties, and at sea 38 ships and 10,000 men were lost. The invasion fleet withdrew and the entire operation was suspended.

Is this sensationalism or a realistic picture of what might have happened? Will guided missiles ever have such an influence on warfare?

A great deal of confusion has centered around the potentialities of guided missiles in future warfare. Not only has the civilian been exposed to many varying theories of "push-button" guided-missile warfare, but the military man also has had difficulty in evaluating this new weapon. Originally, the high security classification of all information pertaining to the subject hindered the spread of a

sound understanding of guided missiles. Yet, there are available now scores of unclassified articles, reports, and texts on guided missiles. But much of such reading matter is of so technical a nature, or is so obscure where tactical employment is concerned, that a person making a study, unassisted, finds the task too tedious. The matter of primary interest to most army officers is the effect of this new weapon on ground warfare. They ask, "What can it do? How can we use it?"

Factors Affecting Ground Warfare

What will be the effect of guided missiles on ground combat operations? The guided missile, as a weapon, must be considered as one of several factors which will determine the nature of the next war. These factors are:

1. *The enemy.*—His war potential, his political and military aspirations, and his location, routes of approach, terrain, and vulnerability.

2. *Our own war potential.*—Obviously, our industrial potential, source of war materials, population, land mass, and vulnerability to attack determine our ability to wage war. Our immense industrial output, for example, will permit us to use comparatively large numbers of guided missiles; an achievement few other nations can duplicate.

3. *Our strategic objective.*—Ultimately, our strategic objective in warfare is to

nately has changed some aspects of ground combat. What of the guided missile?

5. *New defensive means.*—In World War II, radar greatly improved air defense. The antiaircraft guided missile eventually will have an even greater influence on air warfare.

The major decisive forms of warfare—air, ground, and naval combat—will all be influenced by the introduction of guided missiles. Also, it must be remembered that air, ground, and naval warfare are mutually interdependent. Therefore, a new antiaircraft guided missile will not only concern air warfare directly, but will also affect ground warfare in a very definite, though indirect, manner.

The Surface-to-Surface Missile

What is the direct effect on ground warfare of the ground-launched guided missile destined for enemy surface targets? This weapon is referred to in guided missile terminology as a surface-to-surface missile or "SSM."

There are two basic types of SSMs that will be used in support of ground operations—rockets and atmospheric jet missiles. The first type carries both its fuel and oxidizer and is not limited to flight within the atmosphere of the earth. It has a trajectory similar in shape to that of an artillery projectile. The German V-2 missile is an example of this type.

The second type is a winged missile

In future military operations there will be ground targets beyond the capabilities of either artillery or aircraft. Guided missiles, the latest type of fire-support weapon, can accomplish this important task

destroy, or neutralize, the ability and will of an enemy nation to threaten our national sovereignty. From a practical standpoint, the achievement of this objective may vary greatly, and, therefore, alter the nature of our ground operations.

4. *New weapons.*—The airplane defi-

which carries its own fuel, but utilizes atmospheric oxygen to burn its fuel. The German V-1, or "buzz bomb," is a historic example of this type of missile. The atmospheric jet missile is generally slower than the rocket; is limited to flight within the atmosphere; and is more vulnerable

to enemy countermeasures. Yet, since it resembles aircraft in many respects, conventional airframes, propulsion systems, and fuels may be used in the production and employment of the missile. This is an important advantage of the atmospheric jet missile. At present, the rocket-propelled guided missile is generally considered the better missile at shorter range, while the atmospheric jet is more suitable for extreme range.

The range of SSMs varies tremendously. Eventually, we may employ in ground combat SSMs varying from small antitank missiles, with only a few thousand yards range, to large missiles carrying several tons of warhead hundreds of miles into enemy territory.

The Need for Surface-to-Surface Missiles

One may logically ask why we need SSMs. What target will they be used against? Guided missiles are needed not for some important new target, but for attacking existing targets, under special circumstances, which make their use more profitable than the use of artillery or aircraft. First, review briefly the limitations of conventional artillery and aircraft to determine why there is a need for guided missiles.

Artillery has inherent limitations in range, lethality, and accuracy. Accuracy limitations are largely overcome by mass fire, and lethal effectiveness is also improved by the mass fire technique. Range is the most important limiting factor in artillery. The only answer to this problem is increased muzzle velocity which is always accompanied by greatly increased size and weight of the gun. Conventional artillery, as we know it or with foreseeable improvements, cannot be considered a practical, mobile support weapon at ranges greater than 20 or 25 miles. The SSM is needed, then, to provide accurate demolition fire against heavily protected targets within artillery range and to

extend the effective range of artillery.

Why are SSMs required in addition to aircraft? Certainly the range of aircraft is almost unlimited and aircraft bombs have great destructive effect. How can a target be beyond the capability of aircraft? First, aircraft often will not be available to the ground forces because of adverse weather conditions. Weather is an uncontrollable factor in the employment of air power. Because of weather, aircraft are not capable of providing the continuity of fire support that ground forces need. Ground commanders are unable to depend upon air support entirely when planning operations and must be prepared to carry out their missions without it. When air co-operation is an integral and vital part of a ground force plan, then the success of the entire operation is dependent upon favorable weather conditions.

Second, the primary mission of tactical aircraft in support of ground operations is that of achieving and maintaining air superiority. We cannot expect air superiority at all times. Therefore, the attack of ground targets is a secondary mission which aircraft will not undertake, to any great extent, until the enemy air power is neutralized. Also, a ground target may have such an effective air defense that sustained air attacks can be undertaken only at prohibitive cost. Finally, the limited accuracy of aircraft bombing should be considered.

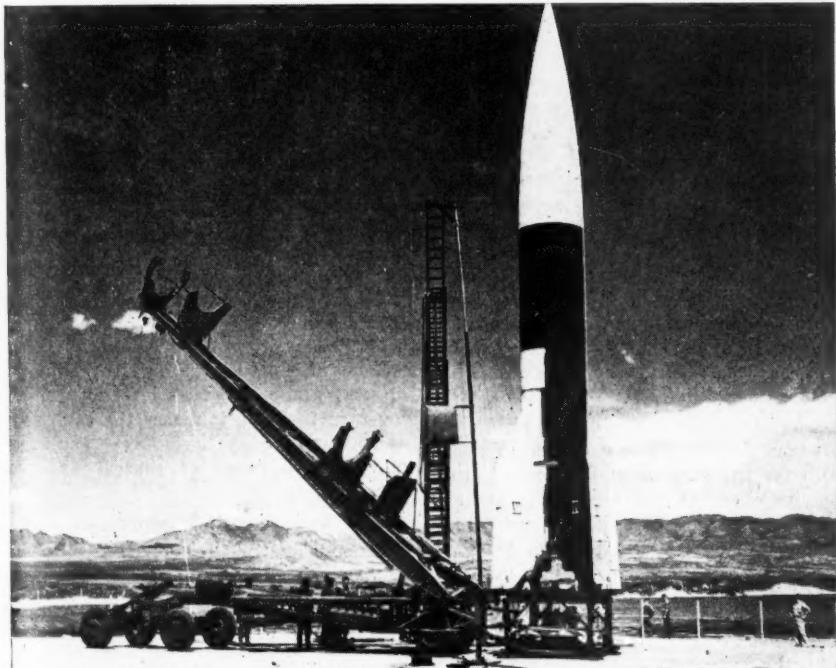
Therefore, the role of the SSM in ground warfare is to attack surface targets when artillery or aircraft either cannot be used or are less desirable because of their inherent limitations. The supersonic SSM is almost completely invulnerable to enemy countermeasures. No lives are risked as they are when aircraft are used and little or no advance warning is given the enemy. Of extreme importance to the ground commander is

the fact that the weapon will be directly under his command, immediately available for attacking targets at his discretion.

The SSM is not without disadvantages. Of foremost concern is the present limited accuracy of the weapon, especially when fired great distances. The *V-1* and *V-2*

Tactical Employment

Consider how this weapon might be employed tactically. Because of two major drawbacks—missile dispersion and the limited number available—SSM targets must have two important characteristics; they must have an area commensurate



A German *V-2* rocket being prepared for launching at the White Sands Proving Grounds, as part of the Army's research and development program.—Department of Defense photo.

missiles had a circular probable error on the order of 4 percent of the range. This inferior accuracy is certain to be improved. The dual problem of accurate target location and missile dispersion is not easily solved, but there are definite indications that SSMs ultimately will be highly accurate. Another drawback is the logistic effort involved in SSM employment because of construction costs and supply problems.

with the accuracy of the missile and they must be of unusual importance. At ranges of 20 to 100 miles, targets which may be considered appropriate for SSM attack are major troop concentrations, marshalling yards, supply depots, important command centers, ports, and beachheads.

At closer ranges (perhaps up to about 50,000 yards), smaller targets which might be appropriate for SSM attack are heavy fortifications, important bridges,

troop concentrations, supply dumps, and vehicle concentrations.

Many attacks on targets deep in enemy territory may be made for the purpose of isolating the battlefield. Other targets may be attacked by SSM for the purpose of destroying the target itself rather than disrupting the enemy communication system.

Some means of target observation is extremely desirable in the employment of SSMs. Targets must be discovered and located accurately although a large proportion of the firing itself may be unobserved. After attacks, a damage analysis of the targets must be accomplished. Visual, photographic, and radar reconnaissance must be utilized to the fullest extent. Photo-reconnaissance guided missiles may be used in addition to other more conventional means. Enemy missile launching sites and artillery positions will be accurately located by means of radar observation.

Guided-missile fire, like conventional artillery fire, should be employed in mass, both for the purpose of fire control, and for its effect on the enemy. To permit the use of mass fire and to ensure co-ordination, launching sites will be controlled by battalion-size organizations.

Level of Employment

Shall the SSM battalion be employed at division, corps, army, or army group level? At every level the commander needs supporting fire commensurate with his zone of interest. Present artillery, while adequately covering the zone of interest of the division commander, falls short at corps level and above. A 50,000-yard missile, employed at corps level, probably would not exceed the area of responsibility of the corps commander. However, if an SSM has a 100 mile range, it presumably will reach target areas beyond division or corps responsibility. A battalion firing this type of missile probably would be

attached to the army for general support, under the command of the army artillery commander. The SSM, being an artillery weapon, very properly belongs under the artillery commander. Battalions attached to individual field armies may be given fire missions by the army group or theater commander, and yet be available to the army commander. SSM battalions at army level could be in general support of the army, reinforce the support of a corps, or be massed on army group or theater targets. Visualize the devastating impact of five or six battalions massing on an enemy division concentrating to make a river crossing. Without warning, 25 to 30 tons of high explosive would strike the enemy area simultaneously with a speed and accuracy not possible with any other weapon. The potentialities of an atomic loaded guided missile are even more awesome.

Some SSM battalions may be employed at army group or theater level for attacking targets which influence the campaign as a whole. Such high level "artillery" may have a range of several hundred miles.

Technique of Employment

In offensive operations, SSMs can be employed to support almost any maneuver. In a penetration, SSMs can be used for direct support of the main effort and for isolation bombardment of the area to prevent the enemy from committing his reserve against the penetrating force. In an envelopment, isolation bombardment can immobilize the enemy being engaged and hinder the movement of his reserves to a critical flank. The attack of any communication bottleneck developing in the enemy rear area as a result of the completed envelopment also may prove profitable. In a pursuit operation, or in a turning movement, the long range of SSMs can be used to great advantage. In fact, guided missiles will be particularly useful in any operation where the rate or

nature of movement makes conventional artillery support inadequate or impossible. For example, in amphibious, airborne, jungle, and mountain operations, SSM fire can be used to supplement normal fire-support weapons from great distances.

In the defense, guided missiles may play a most vital role. If the enemy is on the offensive, he must concentrate his forces; and these concentrations can be attacked with devastating effect. Guided-missile artillery units will not have to move long distances to meet an attack at an unexpected point. The range of the weapon will permit the rapid shift of fire (from launching sites placed well back in a defensive situation) to any point along an extremely wide front. A 100-mile-range missile at field army level not only can fire along the army's entire front, but along the fronts of adjacent armies as well. In the near future, no preponderance of enemy force on the ground, or in the air, will be able to eliminate defensive guided-missile fire until the launching sites are overrun. The continuous employment by the Germans of the *V-1* and *V-2* to the very last, in spite of overwhelming opposition in the air and on the ground, proved this principle. Only the inferior performance characteristics of the *V*-weapons prevented their widespread use in this defensive role.

Guided Missile Logistics

Guided-missile units will require considerable logistic support. A rocket-type SSM ready to fire may weigh up to 10 times the weight of its warhead. This means that for every ton of high explosive delivered to the enemy as much as 10 tons of matériel must be transported to the launching site. In the 100-mile-range category, guided missiles may weigh from 3 to 10 tons. Firing large numbers of these will be, in terms of tonnage, like firing large volumes of medium artillery with the gun itself being launched with each round. Yet, battlefield supply is sim-

plified because the missile can be brought up in light separate loads, assembled, and fired from areas far behind the front lines.

Production costs also must be taken into consideration. It required about 900 man-hours of German labor to produce a *V-1* missile and 4,000 man-hours to build a *V-2* rocket. The production time for our own SSMs probably will lie somewhere between these two figures; and perhaps with modern mass-production methods, it will be closer to the lesser figure. This is an impressive, but not an impossible, figure for a single round of ammunition. Moreover, while the cost for each round may be high, the total expense of destroying a particular target may be less with guided missiles than with any other weapon because of the increased accuracy and lethality of guided missiles.

Another important logistic factor is that, since complicated equipment is being handled, there will be a need for a large number of skilled technicians in the combat unit as well as in the supporting units. The logistic effort in the field of guided missiles will be great, but employment of SSMs in support of ground operations will not only prove logically possible but logically profitable.

Conclusions

In the light of present development, it appears that guided missiles will have the following direct effects upon ground warfare:

1. The depth of the combat zone will be greatly increased. Many targets which once were considered strategic, because of their distance behind enemy lines, will become tactical. Indeed, the concept of dividing strategic and tactical employment by a measurement of distance is an erroneous one. If troops or matériel that can be moved into battle within a few days are tactical targets, then is not an enemy airborne division assembling a

thousand miles away for a combat mission a tactical target?

2. The increased dispersion of troops and matériel will be necessary. The massing of troops will have to be done quickly and secretly, followed by rapid dispersal. Increased dispersion of forces means greater demands on small unit leadership and discipline. Commanders at every level are likely to find themselves operating independently. A sustained and definable "front" may be the exception rather than the rule.

3. A greater continuity of ground action, regardless of weather conditions, will be possible. Since the guided missile is an all-weather, day-and-night weapon, ground forces no longer will be wholly dependent upon aircraft for the neutralization of critical ground targets which are beyond the capability of artillery.

4. Ground operations including guided missile units will become increasingly dependent upon logistic support. Hence, supply lines and sources of supply will grow in importance as targets.

5. The defense will, temporarily, have an advantage over the offense. SSMs will be particularly valuable in countering an enemy offensive by devastating fire whenever he attempts to concentrate. However, as missile accuracy and guided missile countermeasures are developed, counter-missile fire will reduce the advantage of the defender. Eventually, the only effective defense will be an active and mobile counteroffensive.

6. The cost of war will increase. It has been said that in Caesar's time it cost about 75 cents to kill a soldier in battle. In Napoleon's time it cost 3,000 dollars. In World War I it cost 21,000

dollars, and in World War II, 200,000 dollars. If these figures have any semblance of verity, what will it cost in a war involving the consumption of thousands of guided missiles? This point is introduced not because the large-scale employment of guided missiles will be impossible, but because production costs will be great, and, therefore, should be included in any war plans.

With the passage of time, continuing developments will only accentuate these changes. This time factor makes an accurate appraisal difficult, and any dogmatic conclusions without considering time would be impossible.

On the subject of future warfare there are two extreme schools of thought. The more appealing is the "push-button" concept which holds that future wars will be won or lost solely by intercontinental battles with atomic guided missiles. The other contention is that the atomic bomb is merely a bigger bomb and does not alter the fact that war must be won on the ground; that all weapons of war exist to help the ground soldier advance. For the coming decade, though, the correct solution lies somewhere between these two extremes. Even if the weight of decisive military action were to shift entirely to air warfare, ground troops would have to repel enemy invasion attempts, seize bases needed for launching air operations, and physically occupy critical enemy territory. In any operations there will be ground targets beyond the capabilities of either artillery or aircraft. The guided missile, as the third and newest fire-support weapon, will complete the team, by providing fire support whenever and wherever needed.

ARCTIC AIRBORNE OPERATIONS

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The views expressed in this article are the author's and are not necessarily those of the Department of the Army or the Command and General Staff College.—The Editor.

THE battle of Suomussalmi, during the Russo-Finnish War of 1939-40, offers an excellent example for the study of arctic warfare. Here two armies met under severe subarctic conditions. The Russian Army had the advantage of greater strength and fire power, but was ill equipped and inadequately trained for arctic warfare. The Russian Army was road bound and dependent upon long, tenuous, land lines of communication. The Finnish Army had the advantage of over-snow mobility, training, and equipment for arctic operations, and was operating within relatively short distances from fixed facilities. The outnumbered Finns struck rapidly, cut the Russian lines of communication, and encircled and destroyed two Russian divisions before one could go to the aid of the other.

Tactical and strategic mobility and adequate lines of communication are important in all military operations, but they assume still greater importance in

the Arctic and sub-Arctic. Here, the almost complete absence of roads, and the difficulties of weather and terrain, stress the need for airborne and air-transported forces, equipment, and supplies.

Strategic Importance of the Arctic

The importance of the Arctic becomes increasingly evident when one realizes that the United States can no longer be considered isolated from our possible enemies by ocean barriers on the east, the west, and part of the south, and by that formerly impassable barrier, the arctic region on our north. The development of the modern long-range aircraft and guided missile has made it evident that this isolation and natural security is diminishing.

General Carl Spaatz stated, "There are eight great industrial areas in the world today of sufficient productivity to be significant factors in a full-scale war. These eight areas center upon Japan, Central Siberia, the Ural Mountains, Moscow, the Don Basin, Western Europe, the British Isles, and Northeastern United States. All of these key areas lie above 30° North latitude and the two great land masses on which they are located—the Eurasian and North American Continents

Although the Arctic is strategically important to the United States, our present military organization, combat support, equipment, and doctrine are adapted solely to operations in temperate and tropical regions

—have one region of common tangency: the Arctic Ocean with its impassable ice cap. Although the polar ice cap is impassable to ships and surface forces, it offers no barrier to aircraft flying above it. The shortest air route between the central United States and the Urals, between Alaska and Germany, or between Greenland and Japan lies directly over

Conditions Favoring the Employment Of Air Transportation

The Arctic might be considered as two separate countries. A summer country with relatively warm days, almost constant daylight, and swarms of insects; or a winter country of extreme cold, short daylight, and snow. During the summer, the ground thaws to a depth varying

COMPARATIVE DISTANCES

(in nautical miles)

POLAR AIR ROUTE	BETWEEN	EAST-WEST AIR ROUTE
6,575	New York—Chungking	10,850
3,700	Fairbanks—Berlin	7,030
4,320	Chicago—Moscow	4,950
8,500	Honolulu—Khartown	10,600
5,100	San Francisco—Moscow	6,505

the polar region. Clearly, the whole cap of the world, from the 30th Parallel to the North Pole, is the world of air power." A comparison of distances involved in polar and east-west air routes is shown in the chart, above.

From a comparison of these distances, and the fact that aircraft now in existence are capable of delivering a bomb-load over these routes, it is evident that the Arctic route does offer favorable avenues of approach between these critical industrial areas and population centers. Considering the development of guided missiles, it is conceivable that the Arctic would afford suitable launching sites from which to attack industrial areas and centers of population.

Although the Arctic is strategically important to the United States it might be called our military blind spot. During past wars, our forces have fought in many parts of the world, but always in temperate or tropical climates, and our organizations for combat, our combat support, our equipment, and our methods and procedures are, for the present at least, adapted to temperate and tropical regions.

from a few inches to several feet, depending upon the latitude and other factors. The underlying permafrost prevents effective drainage, thereby causing extensive swampy areas. The swampy areas thus created restrict and limit overland movement by even specially designed, low ground pressure, tracked vehicles.

During the winter, movement is hampered by low temperatures, snow and ice, and the absence of roads and trails. Land transport, both during the winter and the summer, is extremely difficult, and at times impossible. At best, travel is costly in time, material, supplies, and manpower. This is further borne out by the fact that air transportation for years has been regarded as the most economical mode of commercial transport in the Arctic. It appears logical that rapid deployment of ground troops over long distances will have to be accomplished by air transportation.

Any plan for operations in the Arctic must include a consideration of the season. During the summer season, the wet, spongy muskeg will restrict movement of vehicles and troops on foot more than



Airborne operations in the Arctic will not involve new tactical principles, but the extreme cold will complicate their application. Above, men of the 187th Regimental Combat Team landing near Taegu, Korea, during a training jump. Below, members of the 82d Airborne Division assembling their equipment after a jump.—Department of Defense photos.



will the snow in wintertime. The winter season offers the advantage of clear weather with good flying conditions, as well as the use of frozen lakes and streams as landing fields for assault planes and paratroopers.

Further development of the multiple wheel type landing gear on presently available troop carrier assault and cargo transports will enable landing on the relatively rough, irregular, frozen tundra.

Methods of Employment

The Arctic can be likened to a vast sea, with the relatively small, developed areas isolated from one another much the same as islands in an island group. The loss of any one area may jeopardize the safety of the other areas. Movement on the ground is limited, both summer and winter, to relatively short distances from these areas.

Large-scale operations appear unlikely in the Arctic because of the enormous difficulties imposed by the weather, terrain, and limited mobility. Fighting will be by relatively small, highly trained, and completely equipped forces.

It may be stated that operations in the Arctic will be conducted within isolated localities situated around critical areas or installations. Transportation within these areas will be by organic equipment, modified as necessary for the existing conditions, and will be limited, both summer and winter, to short distances from fixed facilities. These localities can be made mutually supporting by the full utilization of air transportation.

The employment of airborne forces in the Arctic will conform in general to current basic principles, procedures, and tactical doctrine, but certain environmental factors will introduce considerations which will make their application more difficult.

The increasing importance of the north-

ern polar air route indicates that military objectives will be airfields, bases, and meteorological stations, or areas suitable for their establishment. Other types of operations for which airborne forces may be employed in the Arctic are:

1. Reinforcing and protecting airfields, supply bases, harbors, communications centers, and other important and critical areas.

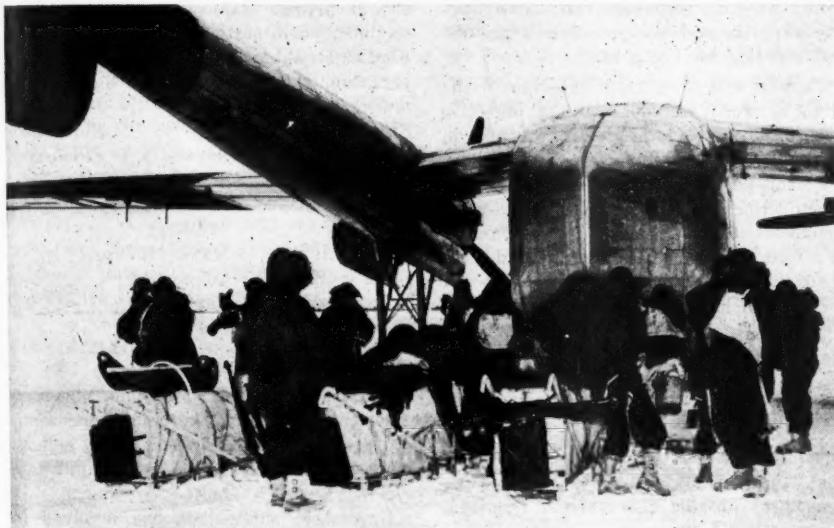
2. Repelling enemy forces that attempt to seize a base or expelling an enemy that has seized a base in territory under our control.

3. Protecting and securing isolated weather, radar, and airways stations.

Training and Equipment

The airborne trooper must, in addition to his specialized training as a paratrooper, receive the training necessary to enable him to fight effectively in the Arctic. The training required to familiarize him with special arctic equipment must precede unit training in the application of arctic techniques to tactical principles. Personnel selected for parachute duty in areas of extreme cold must be carefully screened, both physically and psychologically, as the hazards involved in arctic parachute operations impose sufficiently severe nervous strain to crack an individual with any weakness.

The equipment carried by each individual jumper must include the essentials for his movement, shelter, and food for the first 24 hours on the ground. This should include a mountain sleeping bag, poncho, extra clothing, rations, and catalytic type warmers similar to those now commercially available. He must jump carrying snowshoes of the "bear paw" type to provide oversnow mobility for the assembly and reorganization phase of the operation. These snowshoes are fastened to the parachute harness and other items are carried in a rucksack secured to the parachute harness beneath the reserve para-



Air transportation provides a rapid and efficient means of moving personnel and supplies, to and within the Arctic. Above, troops of the 2d Infantry Division preparing to move out in Alaska's "Exercise Yukon" held during the winter of 1947-48. Below, "Exercise Yukon" personnel and equipment prior to their take-off.—Department of Defense photos.



chute. Skis dropped with the accompanying supplies and equipment will provide the mobility for the assault.

Careful attention must be given to the clothing worn en route to the objective area. Sufficient clothing for warmth in an unheated plane will be excessive after the drop has been made, thereby causing perspiration which will freeze and cause casualties. Insufficient clothing will result in a cold, energy consuming ride and stiffened muscles, which will result in an increase in landing injuries.

This indicates a need for blanket-type, electrically heated warming equipment as part of the troop carrier transport equipment. This will be left on the seat when the trooper stands to hook up. This type of equipment should not take more space than the extra clothing that would be needed to provide the warmth required.

The added bulk of the trooper resulting from the heavy clothing, the snowshoes, and the rucksack with necessary equipment will reduce the number of personnel that can be carried in the currently available transports from 42 to 30. This will result in a corresponding increase in the number of planes required. The further development of lighter clothing with improved insulating characteristics and lightweight collapsible snowshoes and skis currently undergoing tests is desirable.

Shelters of the Jamesway type (canvass on aluminum hoop frames), tentage, inflatable igloos, and prefabricated shelters made of 4 foot by 8 foot sections of aluminum and insulating material must be dropped. These will be used as aid stations, command posts, warming huts, and troop shelters. This provision of necessary shelter will also increase the number of planes required for supply and equipment drops.

Aerial delivery containers presently available will require modification. The ideal container is from 5 to 8 feet long and oval in cross section. The design

should provide for separation into two sections, each section of which may be used as an ahkio-type sled. Wheeled transportation should be replaced on the following basis:

	<i>Substitute</i>
2½-ton truck	Snowmobile (<i>Penguin</i>)
¾-ton truck	Snowmobile (<i>Penguin</i>)
	w/1-ton sled, or <i>T46E1</i>
	(<i>Otter</i>)
¼-ton truck	<i>M29C (Weasel)</i>
1-ton trailer	Cargo sled
¼-ton trailer	Cargo sled
Recovery vehicle	<i>D-6</i> tractor

Planning

Tactical planning for the operation must consider the difficulty of cross-country movement. The assault drop will be made on the objective or in its immediate vicinity.

Special considerations are involved in the landing area intelligence study. These (in addition to the normal considerations of location and landmarks; size and shape, including maximum absorption of assault aircraft and parachutists; and obstructions and locations of enemy defenses) must include the following:

1. Thorough and effective photographic coverage by reconnaissance aviation, because the selection of drop zones and landing zones from maps or similar sources of information will not be adequate.
2. The use of ice-covered lakes, or other water surfaces, for suitable landing zones.
3. The depth of snow and drifts.
4. The direction of prevailing winds as indicated by snowdrift.
5. The location of landing fields in the forward area to avoid cold air drainage from surrounding high ground down onto the airfield. This will avoid the prevalent early morning fog.

The briefing of pilots and jumpmasters and the orientation of all parachutists must be extremely thorough for arctic op-

erations, because in snow-covered terrain all areas look more or less alike.

Marshalling

Marshalling camps should be located at the troop carrier airfields. Heated facilities must be provided for packaging, and, where possible, for loading.

During the loading phase, rapid motor transport is provided between the marshalling areas and the departure fields. Take-off must be rapid and closely controlled to reduce the time that personnel are exposed to the cold to a minimum. Temperatures in ready rooms are controlled to avoid overheating the troops prior to exposure to extremely low temperatures. Overheating will subject the body to chill and will result in casualties.

Personnel efficiency is lowered in the Arctic during periods of extreme cold. This contributes to slower loading and results in delays in aircraft departure. To reduce the effects of lowered efficiency, plans are made to provide for compact aircraft parking near the supply and equipment storage areas. The loading crews should not be exposed to extremely low temperatures for long periods. If provision cannot be made for loading the aircraft in a heated building or in a warmer climate, it becomes imperative that the aircraft be loaded at least 8 hours before take-off time. This will allow the loading personnel who are to take part in the operation to recover from the effect of the extreme cold. If the loading personnel become thoroughly chilled, they will be psychologically ill-prepared to go into action. The preparation of the troop carrier transports presents added difficulties. The proper performance of maintenance will require heated work facilities or be extremely time consuming. Nonskid flooring is provided in troop carrying transports to provide traction for the paratrooper when snow is present and permits proper exiting.

Special care should be given to equip-

ment packaging. Equipment and supplies that are likely to be damaged or become temporarily inoperative by exposure to extreme temperatures are packed in special bundles. Supply agencies at the marshalling area must be capable of preparing and modifying equipment bundles up until the time that final loading is completed. Special precautions are taken to reduce the recovery problem. Bright colored parachutes and streamers attached to the bundles will aid recovery; however, when used, they influence camouflage and concealment. Specially selected supply drop zones on small frozen lakes and dry land surfaces free from obstructions will reduce the loss rate. Present methods and equipment for heavy drop are adequate. Current heavy drop procedures require transports to fly with rear doors removed. Methods must be developed to keep vehicle engines operational and to provide warmth for the accompanying troops during flight.

The amount of logistical support available will determine the size and effectiveness of forces employed in the Arctic. Large airfields with adequate storage, maintenance, and operational facilities near ports or railheads are necessary. Separate or special air cargo transport units and operating procedures are used to transport cargo to the airhead and combat zones. The importance of air supply is an essential consideration affecting the operation plan, and, as in all operations, the logistical estimate alone might indicate the abandonment of an otherwise feasible airborne operation.

A study of the factors involved indicates that airborne forces must be so located that they will not be rendered immobile or unduly delayed by marshalling difficulties in extreme weather. The most feasible solution for the employment of airborne forces in the Arctic is to locate a trained, equipped unit outside the Arctic, but close enough to be moved in by

air when needed. Elements of these forces should be rotated in arctic areas for training and acclimatization. Further, it may be stated that if such a force is located in the Arctic it will result in a partial commitment with an accompanying loss of over-all effectiveness.

, The Air-Landed Infantry Division

The substitutions made for the wheeled transportation in the airborne division which were indicated earlier are also made in an infantry division when employed in an air-landed role to reinforce threatened areas or to expand an airhead. Substitutions will be made in addition for other items such as the antiaircraft artillery automatic weapons, prime movers for the medium artillery, and heavy wreckers.

The preparation of loading plans and charts and the tactical training of both the airborne division and the air-transported infantry division designated for employment in the Arctic must be based on the following assumptions:

1. The division should be organized into a division command group and three self-sufficient regimental combat teams (RCTs).
2. Sufficient service elements should accompany the RCTs and the division command group to permit operations either as RCTs or as a division. The remaining service elements which may be needed can be brought forward with the follow-up echelon.
3. Those sections, detachments, or items of equipment which have no value in arctic operations and those sections which could perform their assigned missions in the rear should be assigned to the rear echelon.

4. Each vehicle should have a towed load, providing one cargo sled for each *M29C (Weasel)* and two sleds for each *Snowmobile (Penguin)* except the prime movers.

Conclusions

The strategic mobility of airborne troops is not limited by terrain barriers as are other ground troops. They can be used to seize and hold key points until slower moving troops arrive. Oversnow equipment must be provided airborne troops or they will be immobilized.

Air-transported operations provide a rapid and efficient means of moving personnel, supplies, and equipment to the Arctic and within the arctic regions. Troops which have been designated for arctic employment must be trained for airborne operations and all their equipment must be air-transportable.

Troop carrier aircraft are capable of performing those operational functions within the arctic regions which they perform in temperate climates, providing satisfactory airfields and cold-weather operative equipment are available. Air supply and cargo transport operations may be the principal missions of troop carrier units because of the almost total lack of surface transportation facilities.

Airborne operations in the Arctic will not involve new tactical principles. The extreme cold and other factors introduce complexities which make their application more difficult.

The planning for the tactical employment of the airborne division and the air-landed infantry division in the Arctic should be based on three self-sufficient RCTs or on the division as a unit.

How Do We 'Get the Word'?

Colonel George C. Reinhardt, *Corps of Engineers*
Instructor, Command and General Staff College

The views expressed in this article are the author's and are not necessarily those of the Department of the Army or the Command and General Staff College.—The Editor.

A COMPARISON of the tactical and logistic links in the United States Army's "chain of command" concept hints at an inexplicable inconsistency. Tactically, these links are firmly joined and, however numerous, form a straight chain, capable of withstanding severe strain. Where logistics are concerned, on the other hand, we notice the unusual arrangement of half a dozen smaller chains of varying sizes welded to one large link. Occasionally, one might rashly imagine he saw kinks in the smaller chains. Let us begin our comparison with regimental (or the comparable group) type headquarters above which tactical and logistic command lines first diverge.

Tactically, we look for a division headquarters, and headquarters company, for each of three regiments; a corps headquarters, and headquarters company, for each four (often less) divisions; an army headquarters, and headquarters company,

for each three (seldom four) corps; and an army group setup for every two (rarely more) armies. If there be two army groups, all this now has, per "doctrine" if not in actual practice, a theater army organization welding it together, prior to reaching the supreme authority (overseas) of the theater headquarters.

What do these command echelons cost in manpower? Ignoring "housekeeping" troops and "palace guards," an army headquarters is allowed 1,061 officers, warrant officers, and men; a corps only 335 (not counting artillery headquarters). Since headquarters higher than army are non-table of organization and equipment units, their size can be only guessed, by comparison.

A field army has approximately 400,000 men, of whom nearly half are not included in the divisional strengths. Therefore, an allocation of 2,066 persons of all ranks (army plus three corps headquarters) to staff the chain of command for nearly 200,000 men seems reasonable enough. It figures little more than 1 percent (of non-divisional troops), which is consistent with "executive overhead" policies in highly successful industrial concerns where "com-

Technological developments in the Army seem to have outpaced organizational progress. Does the new Logistical Command, with its flexibility, solve the problem, or is it merely a wartime expedient?

mand responsibility" is unquestionably less rigorous than on the battlefield.

Of course, we might be picayunish and insist upon adding the 190 men for corps artillery and the (debatable) command detachment for army artillery, but let that drop. Surely those small manpower investments are justified to keep some sort of "chain of command" firmly around every gunner's neck.

No inconsistency has yet been located; but wait. A scrutiny of army technical and administrative services' troops discovers some 80,000, one-fifth of the entire army strength (we omit combat engineers as well as *all* corps troops), completely untrammeled by any link in the "chain." Among them all, more men than four full-strength infantry divisions, there is no organization larger than a group (or regiment), no "general officer commanding."

Four Star Detachment Commander

The inconsistency reaches its full proportions only when we realize that the modest contingent of 2,066 command personnel (including more than a score of general officers) is materially aided in its tactical command function by a dozen division headquarters (containing three generals each). Thus, about 60 officers of general rank control the destinies of some 320,000 men. The other 80,000 in the type field army are, according to existing doctrine and practice, under the *direct* command of the four star army commander himself. Not one officer above the grade of colonel is provided by table of organization and equipment to help carry the lengthy links of the logistic "chain" all the way from the army commander to the refrigerator sterilizing detachments and pigeon repair teams.

No, I have *not* forgotten General "Army Engineer," General "Quartermaster," General "Medico," and others. *They* have another little job on their hands; their

primary duty as staff adviser to the army commander. Nor have I forgotten General "G4," that superman who must weld into one firm link-pin for logistic operations eight separate "chains" reminiscent of the time-honored Anheuser-Busch eight-horse beer wagon in the show ring. Compare these generals' assigned responsibilities with those of tactical commanders: 20,000 troops for the engineer to command "in addition to other duties," 17,000 for the ordnance, 13,000 for the quartermaster, and so on, while a combat division rates three generals for 18,000 men. Now we begin to understand why few people look forward happily to a career in logistics.

Yes, I heard that crack from the back of the room! "Logistic troops don't have to fight." Tell that to the veterans of Bataan, North Africa, and at least the early days in Korea; after you have your chin well covered. We will let it pass and return to the eight-horse team idea. (Most G4s would suggest that mules are more appropriate. There was a 20-mule team once, with its picture on boxes of Borax. Note the number of outriders on those mules. No score of mules produces a concerted effort in response to any *one* man.)

What was that? Oh, yes the "we won didn't we?" argument again. Sure we did, eventually, but you have your minds fixed upon what General Bolte called the "plush lined later phases of World War II which we may never again experience." Consult General Joseph P. Cleland (MILITARY REVIEW, Mar 1950, p 14) about Guadalcanal, where "the first United States offensive operation in the Pacific came close to failure" for lack of logistic organization. Consult General Ross, European Theater of Operations transportation chief, about the amount of ammunition in the "pipe line" exceeding all that fired from Normandy to the Elbe without (often) having too much on any battery position.

Remarks like those from war-wise leaders should raise doubts that, logically speaking, no room exists for improvement. Should it require, as World War II planning factors advised, 10 percent of all theater personnel to "operate all storage within a theater" in addition to troops required to transport those supplies? Was "too little and too late" caused at Guadalcanal by failure to dispatch matériel, when as many as 90 ships lay idle in one New Caledonia harbor waiting to unload, or could it have been faulty logistic organization in the combat zone?

Wartime Expedient—Or Progress?

In an effort to improve conditions, General Maxwell, War Department G4, directed the Command and General Staff College, late in the war, to plan for a "Logistical Division" which would command, and thus co-ordinate and control, technical service troops in the execution of their logistic mission. (A historical sketch of this new type organization appeared in the January 1951 issue of the *MILITARY REVIEW*.)

Following a field test in the European Command (1946), several revisions of its organization, and a redesignation to "Logistical Command," these units are today operating both overseas and in the United States. The maneuver "Southern Pine" included one; "Long Horn" had one. Yet, to most of us, they remain something more, rather than less, of a mystery.

Logistical Commands no longer have assigned troops, like combat divisions, but operate a headquarters only (like corps headquarters) with whatever troops may be attached to them for the job at hand. Their concern is primarily logistic, as a corps' mission is primarily tactical. Whether or not they are capable of tactical operations (defense of rear areas and other emergencies) remains an explosive question. If a "separate" corps can be expected to handle logistic matters, no

greater stretch of the imagination is needed to envisage a Logistical Command headquarters directing combat in its area when the need arises.

The United States Army does not produce officers in two separate molds, one logistic and one tactical. Are not combat division, and army, commanders held responsible for logistics as well as tactics? Do we contemplate staffing Logistical Commands with an inferior type of officer whose dull mind is so cluttered with figures, his pockets so stuffed with slide rules and statistics, that he is incapable of tactical leadership? Without resorting to research, we can recall such names as Robert E. Lee, George B. McClellan, Douglas MacArthur, Leonard Wood, D. I. Sultan, and Lucius Clay filling posts at least as exalted as theater commander. All of these officers served many years on logistic duties before attaining their multistarred grade. Are we justified in concluding that Logistical Command staffs and commanders are incompetent tactically, or is prejudice and stand-patism speaking?

Logistical Commands are now packaged in three sizes, dubbed "A," "B," and "C," in ascending order of size (and rank of commander). Including their headquarters company, they are allotted respectively 216, 419, and 602 personnel of all ranks. Compared with tactical headquarters of equivalent size and assigned tasks, their rank allocation is distinctly modest. Type A has one colonel and one lieutenant colonel. Type B rates a lone brigadier general and one colonel. Only type C possesses 2 officers of star rank plus 22 colonels. They are (according to Command and General Staff College Special Text 600-150-1, *The Logistical Command*, dated 30 November 1951) expected to command approximately 10,000; 40,000; and 90,000 men, respectively.

All this would imply that a type C Logistical Command would be an appropriate

command vehicle for the service troops of a field army. Such is the case in Korea, but "doctrine" frowns at its wide acceptance. Objections such as "empire building," pyramiding of headquarters, and the like are thrown against it.

Doctrine, Clausewitz to Clark

Before we analyze those objections, consider for a moment what tasks are actually involved. We have reviewed the tactical chain of command. It, too, has not wholly escaped criticism. Compare General Clark's "never were so few commanded by so many" (*Calculated Risk*, referring to the Mediterranean theater) and the old maestro Karl von Clausewitz's theory that unity of command suffers from dilution through numerous headquarters' echelons.

But we are not debating the optimum number of links in the tactical chain. The reference was merely for comparative purposes. One army, 3 corps, and 12 division headquarters are authorized to command more than 300,000 men, predominantly infantry, artillery, and armor. Can we not spare a single headquarters for nearly 100,000 service troops? At least 125 *different types of units* comprise this hodgepodge, which is further variegated by belonging to the seven technical services and the Military Police Corps. Since the demise of the engineer brigade, no unit exists higher than a colonel's (group or regiment) command.

Moreover, those units are spread from hell to breakfast over more square miles than the normal deployment of any corps. From corps rear to army rear, between the two army boundaries, there is an area (40 by 60 miles at the minimum) which would include thousands of square miles. Units may be as much as 50 miles from army headquarters.

True, the mission of all units of a field army is the defeat of the enemy. Yet, we recognize considerable variance in their specific contributions to that over-all mission. The military mind mulled over Na-

poleon's startling innovation, combining artillery and infantry into "divisions of combined arms," for more than 50 years before learning the lesson he had taught. The 1st United States Division (first chronologically as well as in title) was not formed until 1917, 30 months after World War I began in Europe. No wonder there is resistance to the concept of a unit combining the logistic operations of seven technical services and the Military Police Corps. But is that opposition based upon any sounder grounds than that of the old-time artillery and infantry who refused to combine until forced?

Is the artillery mission any less different from the infantry's than the work of engineers compared with quartermaster or ordnance units? If, for combat efficiency, we combine the former pair, is there no valid argument for at least testing the possibilities of combining the latter types into a more effective combat-support force?

No School Solution

The Logistical Command is not the only command vehicle which could conceivably be employed, but it is, currently, the only one in the troop list. During World War II, the (then) Army Air Force employed "Engineer Commands" and "Air Force Service Commands." Since ground forces furnished the bulk of logistic support to air in the last conflict, that parallel furnishes only a partial guide for organizing nontactical elements. Following that analogy, today's army would need a separate "command" for every technical and administrative service. Some opinions favor this idea as preferable to expecting army staff officers to wear "two hats," a practice which usually results in the "command hat" being kept in a closet at army headquarters. Others disparage all proposals for change as "unnecessary duplication" and "waste of manpower." That argument brings us back to the comparison with tactical command organization, itself vastly more "duplicated" unless we

advance the tenet that service troops need only a tithe of the command control necessary for combat echelons.

Personnel economy has been sought by alterations in the initial organization. General Maxwell's original "Logistical Division" concept went to the extreme of devising both divisions and corps with assigned troop lists which included all technical and administrative services. That concept admitted the need for attachments to meet special conditions, just as attachments are made to combat divisions when their mission requires. However, the far greater standardization of combat troop types as compared with service units was the handicap. It was quickly realized that situations would arise that would not demand the efforts of all the elements of these logistical divisions (and corps). No workable method of reducing those divisions or putting their extra units to work at other tasks was apparent. Hence, the adoption of the corps (with its wholly flexible troop list) type organization for all Logistical Commands.

The benefits of the Logistical Command in the communication zone are readily apparent. Instead of calling together a group of strangers into a table of distribution headquarters, devoid of team training, we have a cohesive organization experienced in command of various service units under widely differing conditions. Communication zone sections thus formed, selecting type A, B, or C command according to the size of the task, are capable of more quickly organizing and working their sections than the old form of headquarters. As an additional benefit, there is the bar to staff empire building, always so tempting in table of distribution headquarters.

Doubtless, the notion of adding a Logistical Command to the type field army had its germ in the ASCOMs (Army Service Commands) of the Pacific theater. Instead of that temporary arrangement, it

is now suggested in some quarters that a Logistical Command be permanently attached to each field army—its size depending upon the number (and strengths) of that army's corps. Other radicals think small-size Logistical Commands would be an improvement upon station complements of the army service unit type. Why could not larger ones train service units to operate together like divisional training beyond the small unit phase? Ideas are piling up from many directions.

Are All Battalions Perfect?

The value of unity of command among service units has received attention in postwar British organization, principally from the rear area defense angle. Their "army maintenance area," quite similar to our own, is now directly commanded, for tactical operations, by a brigadier assisted by a small staff under the title "Headquarters, Army Troops." Charged with the layout and defense of the army maintenance area, this headquarters is not responsible for administrative-logistic functions in that area. Thus the British setup organically provides for at least a partial equivalent of our Area Damage Control Planning and Operation. United States field armies and communications zones, on the contrary, are reduced to stealing personnel from units to man control centers dubbed ARDACOCs.

Corps (British corps have administrative responsibilities unlike ours) and division do not have such an authorized headquarters, but usually appoint the senior Royal Army Service Corps officer under the intriguing title of CRASC (Commander, Royal Army Service Corps) to temporary command in that area.

The brigadier commanding the army maintenance area is directly under the major general in charge of administration at army headquarters, the "opposite number" of the deputy chief of staff for administration in United States organiza-

tion. However, the brigadier has no logistic (administrative) authority. Consequently, his immediate superior may accuse him of tie-ups in logistics if service agencies in the army maintenance area blame tactical precautions for their logistic failures. This potential bone of contention disturbs no one since recrimination simply is not a British way of doing business. They would talk it over man to man and reach an understanding!

But let us return to that protest of "wasted manpower"! Let us analyze it this time. Ignoring rank, dangerous eccentricity we will admit—but this is pure theory—a type C Logistical Command would add 602 personnel to the army strength. Out of the approximately 100 diverse battalions in army service troops, we need lose the work of only 1 to balance the decried "excess." Is there anyone so biased as to imagine that World War II armies did not "waste" many battalion days' work through inadequate command control? Did all the quartermaster, ordnance, signal, engineer, and other battalions always receive adequate orders on time? Were there no battalion or group commanders who dropped the ball repeatedly before their fumbles became apparent to an army technical service chief whose primary job required him to look in the other direction most of the time?

If unified command of service troops is a ridiculous concept, why does the armored division, one of our newest organizations, rely upon it? Analysts of future

warfare trends who praise the armored division's flexible combat command setup (which incidentally discards the infantry regiment as a wasteful extra link in the tactical command chain) might recognize in its trains command a revolutionary principle. The trains commander, not distant staff officers, directly commands all service (and other) units attached to that command. Most combat veterans will bear witness that armored division trains can fight, in addition to executing their logistic missions. It is possible that the delectable sauce for this divisional goose would be suitable for the army gander?

Summary

Technological developments in modern armies seem to have outpaced organizational progress. The army commander no longer attempts to control his tactical operations by personally issued orders, delivered by aides-de-camp on fleet horses. Has not the time arrived when he can no longer expect his harried G4 to unify, and direct, the increasingly complicated logistic operations, and, in addition, see that service units are able to stage a rousing good fight in an emergency? Whatever the answer, be it Logistical Command, Service Command, souped-up G4 staffs, or something not even proposed to date, we need to apply "unity of command" to our logistic operations. Let us stop arguing details—and continue the field tests so ably begun, overseas, and in recent maneuvers.

We have learned to stand shoulder to shoulder with men of other countries who share our concept of freedom and to fight for that concept in both physical and spiritual union.

General James A. Van Fleet

The Air Invasion of Holland

Major James A. Huston, *Infantry*

Office of the Chief of Military History, Department of the Army
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The views expressed in this article are the author's and are not necessarily those of the Department of the Army or the Command and General Staff College.

This article was taken from a chapter of Major Huston's study on the airborne team, prepared for the forthcoming volume of air-ground studies in the series, the UNITED STATES ARMY IN WORLD WAR II. Requests for permission for reproduction should be addressed to the Chief of Military History, Department of the Army, Washington 25, D.C.

This is the first of a series of two articles on this subject. The second article in this series will appear in the September 1952 issue.—The Editor.

MISSION

THE First Allied Airborne Army's first actual mission was designed to assist the Northern Group of Armies (21st Army Group), under Field Marshal Sir Bernard L. Montgomery, in cutting off the major German forces in Holland and in exploiting the "attractive possibility" of turning both the Rhine and the Siegfried Line. The airborne operation, called *Market*, was to seize bridges which would open the way for armor of the British Second Army

to drive to the Zuider Zee in the co-ordinated ground operation, called *Garden*. The United States 101st Airborne Division was to seize bridges and roads along the route between Eindhoven and Grave; the United States 82d Airborne Division was to capture the bridge over the Maas north of Grave and the bridge over the Waal at Nijmegen; and the British 1st Airborne Division, with the Polish 1st Parachute Brigade, was to seize the bridge over the Lower Rhine (Neder Rijn) at Arnhem. The British 52d (Lowland) Division (Airportable) was to go into the Arnhem area by air-landing as soon as an air strip could be prepared. The ground attack would be on a narrow front, northward from the British Second Army's line along the Albert and Escout Canals in northern Belgium, and for much of the distance only a single road would be available for the axis of advance and supply route. Spearheading the ground attack would be the Guards Armoured Division of the XXX Corps. Its time schedule called for it to reach Eindhoven (about 15 miles north of the Escout Canal) within 8 hours, Nijmegen (more than 40 miles, by highway, northeast of Eindhoven) by noon on D plus 1, and Arnhem (11 miles north of Nijmegen) by noon on D plus 2.

The countless training and planning hours which preceded Operation 'Market' paid off when airborne units landed at the proper time and place and in sufficient concentrated strength to attack objectives

PLANNING

The preparation of earlier plans made in response to continuous tentative demands for airborne troops had served to keep the staffs of the First Allied Airborne Army and subordinate units well informed on the situation and in a position to develop detailed plans for a new operation quickly.

The first mention of plans for Operation *Market* at Headquarters, First Allied Airborne Army, was in a telephone call at 101430 September from Lieutenant General F. A. M. Browning, deputy commander of the airborne army and commander of the British Airborne Troops, to Brigadier General Floyd L. Parks, airborne army chief of staff. General Browning had just returned to England from a visit to the 21st Army Group headquarters on the Continent. He said that General Eisenhower and Field Marshal Montgomery wanted an airborne operation in the same general area as that planned for *Comet*—Arnhem, Nijmegen, and Grave—except that the area should extend farther south. The force to be employed should be enlarged to that contemplated for *Linnet*—three, and possibly four, divisions plus the Polish 1st Parachute Brigade.

That evening, 27 officers, commanders and staff officers of airborne and troop carrier units, assembled at Sunninghill Park to consider General Browning's tentative plan and to discuss major questions on which decisions had to be made in order to permit early completion of detailed planning. General Lewis H. Brereton announced that General Browning, with Headquarters, I (Airborne) Corps (British), would command the initial task force including the British 1st Airborne Division and the Polish 1st Parachute Brigade, the United States 82d and 101st Airborne Divisions, and supporting troops. Major General Paul L. Williams, commander of the United States IX Troop

Carrier Command, would command all troop carrier forces (including the British 38th and 46th Groups) in the operation. A second echelon—including Headquarters, United States XVIII (Airborne) Corps, and the British 52d (Lowland) Division (Airportable)—would go in if and when conditions permitted. Presumably, the American divisions then would come under the tactical control of the XVIII (Airborne) Corps, while the British I (Airborne) Corps would continue to exercise control over the British divisions. Upon making contact with ground forces, the airborne troops would come under the command of the 21st Army Group. General Brereton considered the question of timing of the greatest importance. The date for the operation would depend upon obtaining adequate air photo coverage and maps of the target area, whatever air preparation might be necessary, and the time required for detailed planning, as well as the tactical situation on the ground. Ready date (Y-date) was set for 15 September.

DECISIONS

Early decisions were necessary on a number of fundamental operations in order to permit the completion of detailed planning in the time allowed. Tentative decisions were made at the initial conference and later confirmed or modified according to new developments.

Night versus Day

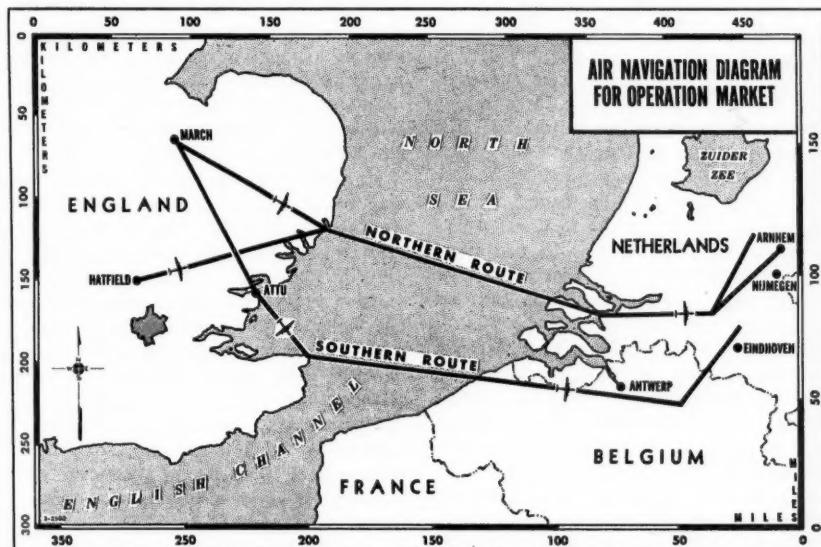
The first question was whether this operation should follow the pattern of Sicily and Normandy in being another night operation, or whether an attempt now should be made to conduct a major airborne operation in daylight. Difficulties of navigation and of assembly of troops on the ground in darkness were well known, and this would be a period of no moon. At the same time, the German night-fighter force, relatively intact (it was estimated that 100 effective enemy night

fighters were within range), might be more formidable than the day fighters—and it would be more difficult for escorting fighters to protect the column at night. Antiaircraft fire could be expected at night as well as in the daylight (and that it could be effective had been demonstrated in Sicily, when friendly ground fire had destroyed more than 15 percent of the

could knock out flak positions in advance and beat them down during the operation. He decided upon a daylight operation.

Routes

Another question to be decided was that of the routes which the troop carriers should follow to the target areas. Several factors, not always compatible, had to be



participating troop carrier aircraft on 1 night's operation). Moreover, the IX Troop Carrier Command had not been practicing night glider assemblies in formation for the last 3 months, and, therefore, gliders probably should be taken in during daylight (the morning after a night parachute drop) in any case. On the other hand, enemy flak doubtless would be far more accurate in daylight. Flak was a primary concern for the slow, low-flying troop carriers. Overwhelming air support against flak and against enemy fighters seemed essential for a daylight airborne operation. General Brereton believed that sufficient air support was at hand, and he believed that the air forces

taken into account. Aside from following prominent terrain features which would simplify navigation, the route should be the shortest and most direct possible; it should respect traffic control patterns of the IX Troop Carrier Command and Royal Air Force units; it should avoid barrage balloon and antiaircraft areas in Great Britain; it should avoid known and suspected enemy antiaircraft batteries; it should avoid turns over water; it should make landfall over prominent, irregular coast line; and it should proceed the shortest possible distance over hostile territory. Preliminary studies suggested two possible routes. The most direct route was one which went across the North Sea from

Orford Ness, passed over the Dutch Islands, and turned northeast near Hertogenbosch; this route required a flight over enemy-held territory of some 80 miles. A more southerly route would go east from North Foreland to Belgium, turn northward near Gheel, cross the ground force front line, and pass over a maximum of 65 miles of enemy-held territory. General Williams recommended that both routes be used—the 101st Airborne Division to follow the southern, and the British 1st and the United States 82d Airborne Divisions to follow the northern. If only one route were used in the initial lift, the column would be so long that the enemy might be alerted in time to bring effective fire against the rear elements, or the aircraft would have to fly in parallel columns so broad that all could not avoid known flak locations. Another advantage in having two routes would be that on subsequent days reinforcing and resupply lifts could be routed either way if weather or enemy action ruled out one while the other remained open. General Browning's original plan had called for the 101st Airborne Division to go into the Grave-Nijmegen area, and the 82d into the Eindhoven-Uden area, but the use of the two routes as outlined by General Williams with respect to the location of the troops in England made it desirable to transpose the objectives of the two divisions to avoid crossing routes. General Brereton accepted the recommendation and changed the divisions' missions accordingly.

Drop Zones

No problem was more important from the point of view of airborne commanders than the selection of drop zones (DZs) for the parachute drops and landing zones (LZs) for the gliders. After careful examination of terrain studies and enemy defense overprints, the troop carrier commander and the airborne commanders made the initial selections at a conference the next morning. They had to consider ac-

cessibility to assigned objectives, ground formation, avoidance of flak and enemy defenses, and concentration of the airborne forces. Again compromise was necessary. It generally was desirable for paratroops to drop directly on an objective, or as close to it as possible. In this case, however, drop zones could not be close to the main objective bridges because flak concentrations protected those bridges. For the same reason, cities had to be avoided generally. Rivers and canals might be hazardous for parachute troops, but streams and ditches in the target area also were a great advantage: they were effective antitank obstacles.

Major General Maxwell D. Taylor, commander of the 101st Airborne Division, was dissatisfied with General Browning's original plan for the disposition of his division. That plan would have spread the division in seven separate areas along an axis some 30 miles long. General Taylor was anxious to concentrate his forces. Sharing his views, General Brereton stated: "Such dispersion destroys its tactical integrity, renders it incapable of fighting as a division, and presents insurmountable problems of resupply. Each small group is susceptible of being destroyed in detail." The First Allied Airborne Army commander raised further objections from the air point of view: the difficulty of making accurate drops on the numerous small drop zones, the problem of finding suitable drop zones in each of the areas, and the exposure of the airlifts to hostile fire over a large area. Finally, General Taylor received permission to discuss the problem with Lieutenant General Sir M. C. Dempsey, the commanding general of the British Second Army, under whose command (through the XXX Corps) the 101st Airborne Division would operate on the ground. As a result, the proposed seven areas for the 101st parachute drop were cut to two general areas. Another factor influencing the selection of drop zones appeared when General Williams

determined that it would be inadvisable to drop parachutists south of the Wilhelmina Canal because of flak concentrations around Eindhoven. This meant that the nearest drop zone would be about 8 miles from that objective. General Taylor estimated that it would take 2 hours for a regiment to assemble after landing, and another 3 hours—a total of 5 hours—for it to reach the city. The principal concentration of 101st Airborne Division troops would be in the area designated LZ "W," between Zon and St. Oedenrode, west of the main highway. One regimental drop zone, DZ "B," would be in the south part of this area about a mile and a half northwest of Zon. Another regimental drop zone, DZ "C," was chosen in the north part of the area about a mile south of St. Oedenrode. All gliders for the division were to land on LZ "W." The third regimental drop zone, DZ "A," was about 5 miles north of DZ "B," southwest of the Williams-Vaart Canal near Veghel. Actually, General Taylor agreed to divide this regiment's drop zones so that one battalion could come down about 3 miles to the northwest in DZ "A-1" on the opposite side of the canal and astride the small Aa River. This disposition might facilitate quick seizure of the bridges in that area from both sides.

All drop zones and landing zones for the 82d Airborne Division, with the exception of one rifle company drop zone just west of Grave, were north of the Maas River. Drop Zone "O," for two battalions less one rifle company, was immediately north and west of Overasselt, and about a mile and a half east of Grave; the drop zone for the other battalion of that regiment was about a mile and a half east of the main DZ "O." The entire area comprised LZ "O" for gliders. DZs "N" and "T" and LZs "N" and "T" were about 6 miles east of this area. DZ and LZ "N" were south of Groesbeek and DZ and LZ "T" were north of that town. (Groesbeek

was about 7 miles southeast of the Nijmegen highway bridge.) The area lay between a large woods and ridge line, on the west, and a hilly, partly wooded region just across the boundary in Germany called the Reichswald on the east.

Drop zones and landing zones selected for the British 1st Airborne Division, all north of the Lower Rhine, lay from 5 to 8 miles west of Arnhem; DZ "K" for the Polish 1st Parachute Brigade (attached to the 1st Airborne Division and scheduled for the third lift) was south of the Lower Rhine, immediately opposite Arnhem.

While detailed planning proceeded, it appeared for a time that D-day would not be before 23 September. Once more the now familiar pattern of operations planned and then postponed or cancelled seemed to be taking shape. However, after a visit of Lieutenant General Walter Bedell Smith, SHAEF chief of staff, to the 21st Army Group, Field Marshal Montgomery announced on 12 September that he had advanced the date 6 days: D-day would be 17 September.

Logistical Problems

Problems of logistics—of getting the necessary equipment and supplies for maintaining units in combat—are often decisive in any kind of warfare. These problems become especially acute and complex in airborne operations. It was anticipated that air resupply would continue for units in Operation *Market* for as long as 10 days. General Williams decided that the distance to the target areas and the reduced hours of daylight would make it possible for troop carriers to fly only one lift a day. The distance also ruled out the use of gliders in double tow in General Williams' judgment. Brigadier General James M. Gavin, commander of the 82d Airborne Division, expressed concern about getting in supplies. If troop carriers could not fly more than one lift a day, it would be D plus 2 before the three airlifts for the troops could be completed,

and supplies could not then come in until D plus 3, which, in General Gavin's opinion, would be too late. He asked that the First Allied Airborne Army make every effort to arrange with the Eighth Air Force for *B-24 Liberator* bombers to drop supplies on D plus 2. General Williams pointed out that a lift of about 200 gliders could be flown on D plus 2 even if supplies were also flown on that day. The need of aircraft for resupply made it unlikely that the 52d (Lowland) Division (Airportable) could go in before D plus 4 or 5.

No doubt it would have been desirable to cut down on distance and to lessen the hazards of unfavorable weather by flying supply missions from bases on the Continent. This was not possible, however, because tactical air forces occupied all the suitable airfields and no continental airborne base was then available.

Supply Responsibility

Because of the nature of the organization of Headquarters, First Allied Airborne Army, and the recency of its formation, many of the supply functions ordinarily performed by an army headquarters were in this case undertaken by the corps. The British I (Airborne) Corps would be responsible for all administrative arrangements for the British units, and it would "have the same responsibility for the supply, maintenance, and evacuation of United States forces as a normal corps has in the field when it operates under a field army." The United States XVIII (Airborne) Corps would be responsible for detailed arrangements for all supplies by air to the American forces. Plans for supply to the American divisions were based on the assumption that they would be withdrawn very soon after the link-up with the ground forces in compliance with Administrative Instruction No. 1, Headquarters, British Airborne Troops, 12 September 1944:

It is the intention that as soon as the ground forces have joined up with the airborne troops

the two United States divisions will be withdrawn. No arrangements have therefore been made for the supply of ammunition, rations, or petroleum, oil, or lubricants (POL) for these divisions in a fighting role. As soon as these divisions have been withdrawn, the 21st Army Group will be responsible for providing such rations and POL as they require from British sources and for making all the necessary arrangements for their evacuation to the United Kingdom.

Supplies would be dropped automatically to all divisions and the Polish brigade; the first full supply drop now was scheduled for D plus 1. Supplies would continue to be dropped by parachute until landing strips could be prepared. The Eighth Air Force did agree to furnish 252 *B-24* bombers, with ball turrets removed, for resupply missions. The crews to handle the supplies on the bombers had to be trained quickly, and arrangements made for moving supplies to the Eighth Air Force bases. Supplies were to move to those bases on 16 September in 110 trucks and trailers to be furnished by the supply services. The men from the services of supply would accompany the loads to the airfields, supervise the loading in the aircraft, and accompany the planes to eject the bundles.

Organic Transportation

The shortage of organic transportation and administrative units in airborne divisions—even including their sea-borne tails which would arrive after ground contact had been established—made it necessary to obtain additional supporting units for them. The First Allied Airborne Army, on 14 September, requested, as "essential," that four quartermaster truck companies, one quartermaster service company, two graves registration platoons, a medical clearing company, an ambulance company, and an evacuation hospital (400 beds) be concentrated in the Brussels area on 17 September and be available to join the American divisions any time after D-day. It was confirmed the next day that the Communications Zone and 12th Army

Group would co-ordinate in alerting and dispatching the units requested.

Other Considerations

Casualties would have to be retained by division medical units until supporting forces arrived. It was planned that when airfields in the division areas had been secured, division medical units would establish advance casualty air evacuation centers, and that the evacuation of casualties to the United Kingdom in returning supply aircraft would begin.

According to the airfield plan, engineer officers were to accompany the XXX Corps until contact had been established to permit their reconnaissance of airfields near Tilburg, Eindhoven, Uden, and Arnhem. It was planned to construct one airfield as quickly as possible and a second and third if necessary. The 878th Airborne Engineer Battalion (Aviation) was briefed on all four fields. Priority would be determined after ground reconnaissance. On D minus 3, Headquarters, British Airborne Troops, decided that the airfields would have to be north of Arnhem in order to avoid adding to the heavy traffic on the roads to the south.

The country into which the airborne troops would go was low flatland, virtually without a ridge system except for one pronounced north-south ridge 5 miles long between Groesbeek and Nijmegen. This ridge rose 200 to 300 feet above the surrounding polders (a polder being a plot of ground which has been reclaimed from the sea and is protected by dikes). Much of the land was below sea level, and, with hundreds of dikes and ditches and small patches of woods breaking its surface, most fields were not more than 200 to 300 yards long. It was a densely populated country, and a number of sizeable towns and cities lay within division objectives. Eindhoven had a population of nearly 120,000; Nijmegen, more than 98,000, and Arnhem about the same.

Another element which had special im-

portance for airborne operations was the weather. It was recognized that the weather in this area was very unreliable and subject to rapid change, though conditions were supposed to be at their best during summer and early autumn. During this time of year, land fogs might be expected in the early morning, as well as sea fogs over the English Channel. There should be light winds and little rain, but visibility might be poor over the sea and coast lands.

German Defense

Because of the disintegration of the German defenses before the rapid advances of the allied armies across France and Belgium during the summer, allied leaders could hope now to strike a blow before the enemy had had an opportunity to organize new positions. In spite of disorganization, the German infantry, supported by *Tiger* tanks and self-propelled guns, was putting up stubborn resistance against the British Second Army. The only defensive works known in the Nijmegen-Arnhem area—and they were not considered formidable—were west and south of Nijmegen. There was no indication that they had been occupied since April. Intelligence estimates suggested that the German High Command had assigned first and second priorities to the stopping of the United States Third and First Armies, and thus Holland had been left generally free of armor.

It was known that the German Fifteenth Army—comprising the 70th, 245th, 346th, 711th, and 712th Divisions—was withdrawing from the Ghent gap (in the area to the west of the British Second Army's forward positions), but it was not known whether the withdrawing troops would be used on the Albert Canal line to keep open the escape route, or whether they would dig in on a river line to the north. Both the German Fifteenth and Seventh Armies were considered to be short of equipment and manpower and were thought

to include weak remnants of many units.

The airborne corps estimated that enemy forces defending the line of the Albert and Escaut Canals had 50 to 100 tanks, mostly *Mark IV*, and that those forces were made up of remnants of some good divisions, including parachute divisions, but that they had few reserves. There were signs that the enemy was strengthening the defense of the river line through Arnhem and Nijmegen, especially with antiaircraft guns sited for both antiaircraft and ground roles, but the troops manning them were thought to be few and of poor quality. This growth in flak defenses was of most immediate concern. Continuous study of the general area during the period 6-11 September showed an increase of 20 percent in gun defenses—a development which was to be expected to continue as the enemy had opportunity to regroup his batteries. According to one flak estimate, "Such an air-landing operation performed in daylight against the flak defenses shown is considered from the flak point of view a hazardous one. . . . [But] accepting the risks involved, it is believed that if sufficient surprise, flak neutralization, and continuous air cover [are available] this operation appears to have the necessary chances for successful accomplishment." On D minus 2, two squadrons of RAF *Spitfires* flew a special flak reconnaissance patrol. Flying at 1,000 feet in line abreast extending 5 to 8 miles, they covered the entire length of the northern route to Arnhem.

Formal Orders

By 13 September, decisions had been made sufficiently firm for formal orders to be issued, though all missions had not yet been precisely defined. The instructions of the British I (Airborne) Corps confirmed the assignments for the divisions:

The British 1st Airborne Division will land to capture the Arnhem Bridges, with sufficient bridge-

heads to pass the formations of the Second Army through.

The *United States 82d Airborne Division* will seize and hold the bridges at Nijmegen and Grave with the same object in view. The capture and retention of the high ground between Nijmegen and Groesbeek is imperative in order to accomplish the division's mission.

The *United States 101st Airborne Division* will seize bridges and defiles on the XXX Corps' main axis of advance to ensure the speedy pass-through of that corps to the Grave-Nijmegen and Arnhem crossings. Definite locations will be notified shortly.

It is the intention to evacuate the 82d and 101st Airborne Divisions as soon as the ground situation permits.

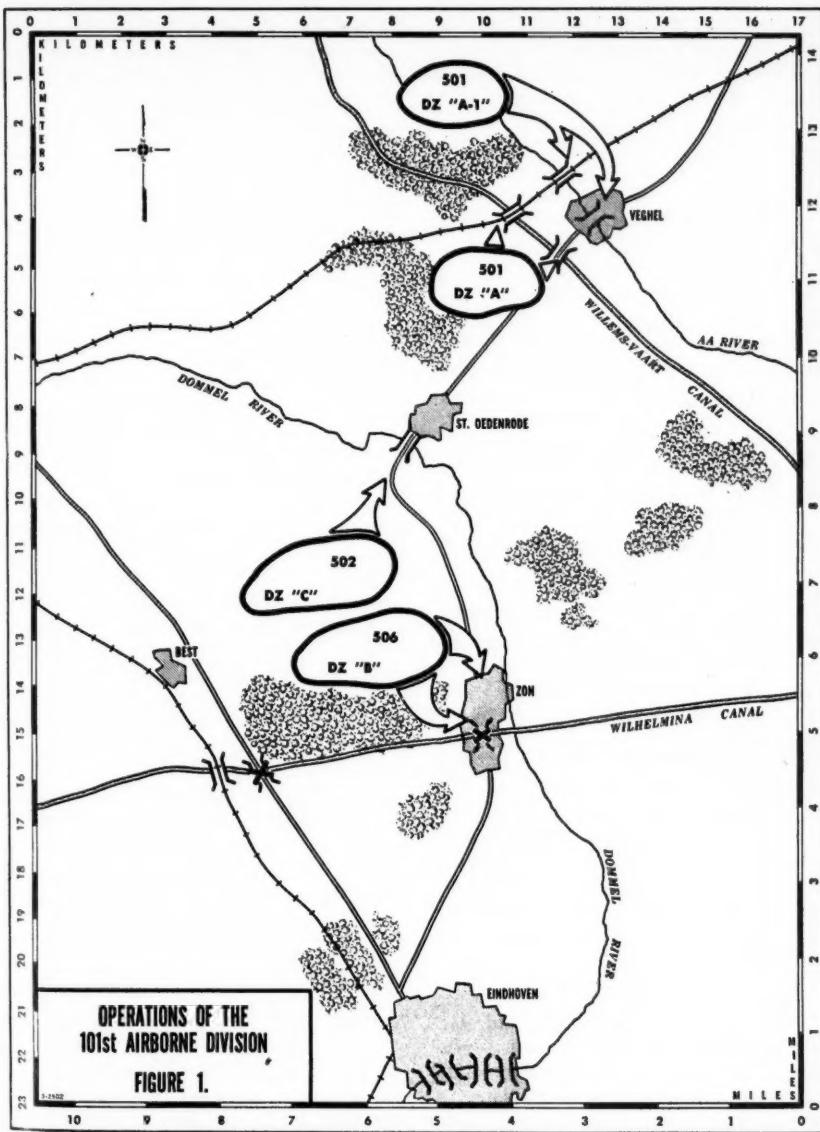
The *British 52d (Lowland) Division (Airportable)* will be flown in north of Arnhem as soon as air strips are available, and will concentrate in reserve nearby, in accordance with orders which will be issued on landing.

The advance headquarters of the airborne corps would go in with the 82d Airborne Division.

While over-all plans were being completed, detailed planning was proceeding simultaneously in the subordinate units. The division plans were confirmed in field orders on 13 and 14 September. A continuation of attachment of additional parachute regiments (except for the withdrawal of the 507th Parachute Infantry from the 82d Airborne Division) since the Normandy operation, and a modification of the glider organization, left the two participating American airborne divisions with infantry elements including three parachute regiments and one glider regiment each. (Official tables of organization and equipment still called for an infantry organization of one parachute and two glider regiments.) The infantry elements of the British airborne division included two parachute brigades (equivalent to American regiments) and one air-landing (glider) brigade.

101st Division

Changes in the 101st Airborne Division's original drop zones and specific missions delayed that unit's field order until 14 September. It directed the 506th Para-



chute Infantry Regiment, with a platoon of Company "C," 326th Airborne Engineer Battalion, and a detachment of the division reconnaissance platoon attached, to drop on DZ "B" (farthest south) and to seize the three crossings of the Wilhelmina Canal near Zon immediately on landing (see Figure 1). The regiment was to be prepared to move on Eindhoven (5 miles south of Zon) within 2 hours after landing, in order to secure stream and canal crossings there.

Dropping on DZ "C," the 502d Parachute Infantry Regiment was to assemble in division reserve, but its immediate tasks were to block the Zon-St. Oedenrode highway and to send detachments to the highway and railroad bridges over the Wilhelmina Canal south and southeast of Best (3 and 4 miles west of Zon). The 502d Parachute Infantry Regiment should be prepared to take over the bridgehead of the 506th Parachute Infantry Regiment at Zon and to support the latter regiment in its move on Eindhoven. It would secure LZ "W" for the D-day glider lift. Division headquarters would jump with the 502d Parachute Infantry Regiment.

The third parachute infantry regiment, the 501st, with two platoons of engineers attached, was to drop on DZ "A" (later modified to allow one battalion to drop on DZ "A-1") and secure the crossings of the Willems-Vaart Canal and the small Aa River in the Veghel area (5 miles northeast of St. Oedenrode). Glider lifts on D plus 1 and D plus 2, including artillery, the 327th Glider Infantry Regiment, and special units, would assemble and await orders.

82d Division

In the area assigned to the 82d Airborne Division, the 504th Parachute Infantry Regiment, with Company "C," 307th Airborne Engineer Battalion, attached, was directed to jump on DZ "C" near Overasselt (one company would jump on the other side of the river, west of

Grave) to seize the main highway bridge across the Maas north of Grave and crossings of the Maas-Waal Canal east of the drop zone (4 miles east of the Grave bridge). (See Figure 2.)

The 505th Parachute Infantry Regiment was to drop on DZ "N." It was to clear, secure, and mark LZ "N" for subsequent glider and supply lifts, to seize and hold the key terrain south and southwest of Groesbeek, and to capture the town of Groesbeek (4 miles east of the Maas-Waal Canal).

From DZ "T" (north of Groesbeek), the 508th Parachute Regiment was to hold the key ridge in the area southeast of Nijmegen and be prepared to move on order to seize the main highway bridge across the Waal at Nijmegen. It was to deny hostile movement southward from the line Hatert—Klooster. Although the 376th Parachute Field Artillery Battalion had been trained to drop, with its 75-mm pack howitzers, by parachute, it never had gone into combat in that manner. On this occasion, however, it was to go in by parachute. In this case, the decision hinged upon the necessity of conserving aircraft and of limiting air space. While a glider field artillery battalion required 95 C-47 airplanes as tugs, plus an equal number of gliders, and occupied 15 minutes of air space, a parachute battalion could be dropped from 48 C-47s taking up only 4 minutes of air space. After dropping on DZ "N," the 376th Parachute Field Artillery Battalion was to mass its fires on Groesbeek in direct support of the 505th Parachute Infantry Regiment. A battery of antitank guns, the reconnaissance platoon, signal company, and additional headquarters personnel and equipment would go in on the division's one glider serial scheduled for D-day. The remainder of the artillery would go in by glider with the second lift (D plus 1). The 325th Glider Infantry Regiment, on arrival with the third lift (scheduled for D plus 2),

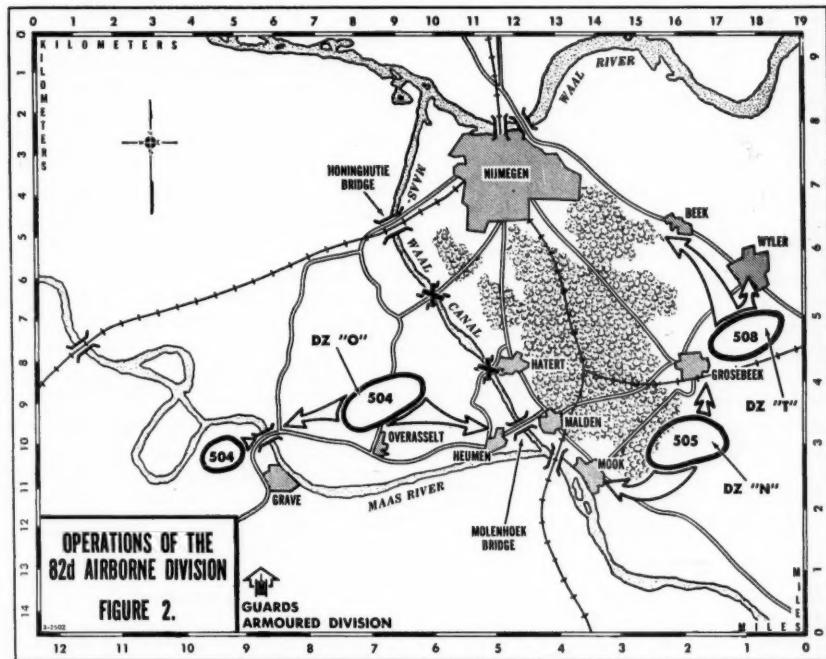
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would assemble in division reserve and prepare to attack Nijmegen.

British 1st Division

In the Arnhem area, the 1st Parachute Brigade of the British 1st Airborne Division had the responsibility for, first, cap-

Brigade, in the third lift, was to land south of the river, opposite Arnhem, to cross the river by the main bridge, and occupy a position on the eastern outskirts of Arnhem. (See Figure 3.) Thus it was hoped to establish a firm bridgehead at the tip of this long corridor which would



turing the main road bridge over the Lower Rhine, and, second, seizing a pontoon bridge a short distance downstream. The 1st Airlanding Brigade was to protect the drop zone and landing zone areas until the arrival of the second lift on D plus 1, and then was to form a perimeter defense line on the western outskirts of Arnhem. The 4th Parachute Brigade, to arrive on the second lift, was to move eastward and continue the perimeter line along the high ground just north of Arnhem. The attached Polish 1st Parachute

project northward from the Escart Canal in Belgium.

Troop Carrier Co-ordination

From beginning to end, of course, all planning of the airborne divisions had to be co-ordinated closely with the troop carrier forces. Beyond those major decisions already agreed upon, the detailed planning of assignment of airplanes, the scheduling of departure fields, and the adjustment of units to coincide with the frequent changes made continuous collab-

oration necessary. It was impossible to maintain complete integrity of both the troop carrier and the airborne units. In general, the airborne troops were assigned to planes in a way to coincide with the tactical air formations which the troop carrier commander desired. Serials were modified, however, when the result would have threatened the integrity of airborne tactical units.

Points of Departure

Since dispositions had already been made for the *Linnet* and *Comet* operations, only minor changes in troop locations now were necessary. The 101st Airborne Division was in the Newbury area (in Southern England), close to the IX Troop Carrier Command fields; the 82d Airborne Division was near Nottingham (in the Midlands), also close to troop carrier fields; the British 1st Airborne Division was still at fields in the Swindon area; and the Polish 1st Parachute Brigade was in the Grantham area. Troops began moving to the take-off fields (17 fields were being used for the American units and 7 for the British) on 15 September and were isolated within their marshalling areas by daylight the following day.

Navigational Aids

Troop carrier arrangements included rather elaborate plans for navigational aids. Even though the operation was to be conducted in daylight, navigational aids would be used to ensure identification of routes and drop zones. Eureka (radar) and compass beacon equipment was set up at wing assembly points; departure points on the English coast were marked by Eureka, compass beacons, and occult (light flashing a code letter); and, midway across the North Sea, marker boats, with Eureka and green holophane lights sending code letters, were placed. Aircraft on the southern route would pass over a white panel "T" and yellow smoke 5,000 yards before reaching enemy lines

after turning at the initial point (IP) near Gheel. Pathfinders would precede the columns to each division area (a pathfinder team from the 82d Airborne Division would mark DZ "O" and two teams from the 101st Airborne Division would mark DZ "A" and DZ "B"). Pathfinder aircraft would carry special radar equipment (*SCR 717-C* and *gee*) by which the crews would find their way to the target areas from the boat markers. The division pathfinder teams would mark the drop zones and landing zones with Eureka, compass beacons, colored panels, and colored smoke (with special color combinations to identify the respective drop zones).

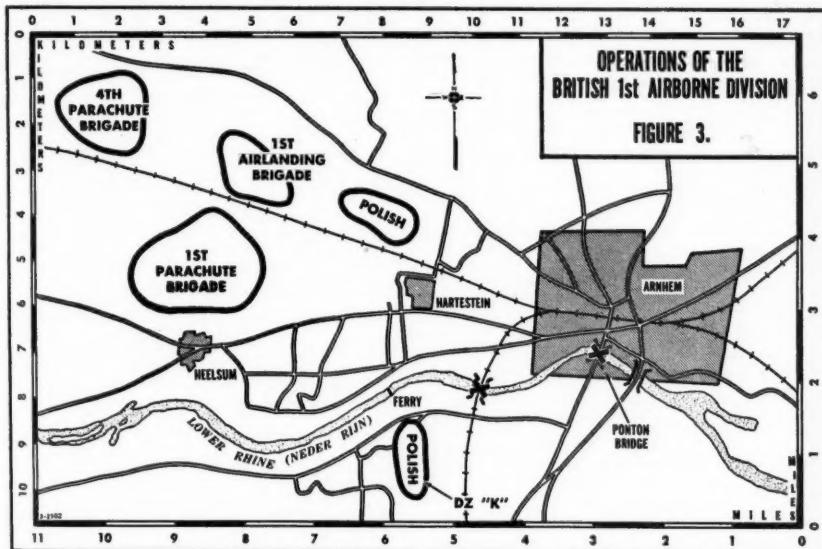
Troop carrier officers gave a great deal of consideration to the keeping of column time length short in order to have the greatest protection from escorting fighters and in order to have carriers over enemy-held territory the shortest time possible. Formation intervals could be tightened over that which had been used in night operations, and troop carrier plans provided that aircraft might fly in three streams—the right and left each separated from the center by 1½ miles. (Actually, RAF planes sometimes formed a fourth stream 1,000 feet above the center.)

Air Formations

Air formations had to allow a certain amount of maneuverability, and, at the same time, give good concentration for paratroops and gliders on the ground. The *C-47s* were to fly in 9-ship elements in a "V" of "Vs" comprising serials of up to 45 aircraft, in trail, with 4-minute intervals between leading aircraft of each serial. Glider columns would form into pairs of pairs echeloned to the right, in serials of up to 48 airplanes towing gliders, in trail, with 7-minute intervals between heads of serials. Altitudes had to be decided with a view to avoiding small-arms as well as heavy antiaircraft fire, to dropping troops and releasing gliders at

minimum safe altitudes, and to assuring clearance of incoming aircraft with those returning from the target area. Troop carriers were to fly at 1,500 feet on the flight out, descend to 500 feet over the drop zones and landing zones, and return at 3,000 feet. Speeds for the aircraft to fly were set as follows: pathfinders, going

the air columns to assure a safe interval between serials while maintaining the shortest possible column time length. It had to allow enough time on the ground for servicing aircraft and for resting crews between missions while exploiting fully any advantage gained by surprise. It had to get parachute troops in early



out, 150 miles an hour; parachute aircraft in the main serials, 150 miles an hour to the initial point, 120 from the initial point to the drop zone, and not more than 110 miles an hour for the parachute drop. Tugs would tow gliders at 120 miles an hour. All aircraft would return at 150 miles an hour. Maximum payloads for the operation were 5,850 pounds for parachute aircraft; 6,900 pounds for *Horsa* gliders; 3,750 pounds for *CG-4As*; and no payload for the tug aircraft.

Timing

Timing was of the essence in successful airborne-troop carrier co-ordination. Troop carrier planning had to time elements of

enough ahead of the gliders to seize glider landing zones, and it had to get a special number of gliders in as early as possible to provide artillery support. The air movement table annexed to the troop carrier field order included detailed plans through the fifth lift (D plus 4), which was scheduled to carry the British 52d (Lowland) Division (Airportable). The table showed the make-up of each serial—the number of airplanes, gliders, or both that it was to include, and the troop carrier group to furnish them—elements of which airborne division or other unit it was to carry, the take-off airfield, the drop zone or landing zone which was its destination, and the time for dropping or landing.

Space was left to note, for each serial, the time the aircraft and gliders were available for loading, the time loading of equipment was completed, the time the aircraft and gliders were ready for enplaning, the time enplaning of troops was completed, and the take-off time.

A time schedule followed which showed the time that each serial, from A1 to A92 (fourth lift on D plus 3), was to cross the departure point, the initial point, arrive at the drop zone or landing zone, and return. One schedule gave all the times in clock-time, according to the H-hour (1300) which had been announced; a second gave all times on the basis of H-hour, that is, H plus so many hours and minutes, so that it would be a simple matter to make necessary adjustments in the event of a change in the announced H-hour. Thus, serials A1, A2A, and A2B, of two planes each, were to take off from the Chalgrove airfield carrying pathfinder teams of the 82d and 101st Airborne Divisions, and then to drop them on their respective drop zones at 1245. Serial A3, consisting of 45 aircraft of the 313th Troop Carrier Group, would take off from the Folkingham airfield with a battalion of the 505th Parachute Infantry Regiment (82d Airborne Division); cross the departure point, Orford Ness, on the northern route at 1119; cross the initial point near Hertogenbosch at 1247; and arrive over DZ "N," south of Groesbeek, at 1300. On the return, the planes of Serial A3 were to recross the initial point at 1314, and the departure point at 1436. The first serial of the main body over the southern route, A4, consisting of 45 aircraft of the 434th Troop Carrier Group, was to take off from the Aldermaston airfield with a battalion of the 501st Parachute Infantry Regiment (101st Airborne Division), cross the departure point, North Foreland, at 1140; pass over the initial point, near Gheel, at 1242; and arrive over DZ "A," west of Veghel, also at 1300. The returning planes of this serial

were to pass over the initial point at 1319, and over the departure point at 1421. The last parachute serial for the 101st Airborne Division (a battalion of the 502d Parachute Infantry Regiment) was to arrive over DZ "N" at 1340. The last three serials, A28, A29, and A30, were to be for gliders—50 for the 82d Airborne Division in one serial, and 35 for the 101st Airborne Division in each of the other two serials. The last serial of the D-day lift was to arrive at the landing zone at 1346.

Commanders briefed the air crews to take no evasive action between the initial points and the drop zones so that troops on the ground could have the best possible concentrations. The wing and group commanders had the responsibility of enforcing the established troop carrier-airborne policy that no paratroops or gliders were to be returned to bases—all were to be dropped or released in the target area.

Air Support

Another major aspect of the planning for Operation *Market* involved the co-ordination of air support. In a preliminary conference on 12 September at the headquarters of the Allied Expeditionary Air Force at Stanmore, and a larger meeting on 15 September, representatives of all participating air forces and commands, together with officers of the First Allied Airborne Army, agreed upon the measures of co-ordination and the assignment of specific tasks.

Initially, the division of responsibility was to be as follows:

1. Eighth Air Force—escort of troop carrier columns and the attack of flak batteries along the route between the initial points and the drop zones and landing zones, and a resupply mission on D plus 1 with B-24 bombers.

2. Ninth Air Force—air support to the airborne troops after the drop.

3. Air Defense of Great Britain (RAF)—escort and antiflak from landfall to the initial points.

4. Coastal Command (RAF)—diversionary raids.

5. Bomber Command (RAF)—diversionary dummy parachute drops and bombing of enemy installations.

6. Second Tactical Air Force (RAF)—photo reconnaissance of the target areas.

The IX Troop Carrier Command established an advance command post at Eastcote and all air commanders concerned used it as a combined headquarters from which all activities could be directed.

After co-ordination through his G3 and the combined headquarters at Eastcote, the Commanding General, First Allied Airborne Army, made all final decisions regarding routes, air support, and weather.

All allied agencies—army, navy, and air force—were informed of the detailed flight plan for the troop carrier columns. The commander of the British Second Army issued orders to all allied troops in the area of the routes and targets, and directed that they should fire on *no* aircraft until further notice.

The troop carrier planes continued to haul freight for ground units until 3 days before D-day. Then, on 14 September, SHAEF notified the army groups that aircraft of the First Allied Airborne Army would not be available for supply lift after that date until further notice.

Weather

At 161630 September, staff weather officers issued their weather prediction for the period 17-20 September. A high-pressure area was approaching from the southwest which probably would bring early morning fog, but the outlook was for generally fair weather through 20 September (D plus 3). Fair weather was predicted for 17 September; fog would limit visibility to 500 yards early on 18 September, but it should clear by late morning. Fair weather should continue on 19 September, but there probably would be fog over the target area in the morning. By 16 September, the detailed plans for all

aspects of the operation had been worked out. That evening the weather outlook was favorable and at 1900 hours the commanding general gave the word to lay the operation on.

D-DAY

At 171040 September, a fair day, with light winds and slight haze, the pathfinder serials of the 101st and 82d Airborne Divisions took off from the Chalgrove airfield, circled, and followed a course generally east to the coast. There the two planes of the second serial circled twice to kill time, and then followed the route of the leading pair. The first two teams were to mark DZ "A," west of Veghel, and the other two were to mark DZs "B" and "C," between Zon and St. Oedenrode. P-47 fighters contacted the flight somewhere over the English Channel to furnish escort. The pathfinders bore north near Bourg—Leopold. Orange smoke, marking the front lines, mushroomed below. Heavy antiaircraft shells began bursting around the formations. The pilots took no evasive action, but they increased their speed to 180 miles an hour. Near Patie, Belgium, heavy flak tore through the left engine and wing tank of one of the C-47s, and, flaming, it fell into a steep dive. Only four parachutes appeared from the plane before it crashed and exploded in a sheet of flame. Some 10 minutes later the other plane of that serial was approaching the railroad which ran generally west to east into Veghel. At this point, the pilot swung to a course paralleling the tracks, slowed the plane almost to a stall (85 to 90 miles an hour), and the pathfinder team jumped exactly on the target. The time was just 10 seconds before 1245.

No enemy resistance developed immediately on the drop zone, and the Eureka was assembled and operating within a minute, and the panel "T" and panel letter "A" were out within 2½ minutes. The antenna for the radio beacon gave some

trouble, but it was operating within 5 minutes. The two teams of the other serial jumped side by side on DZs "B" and "C," and had all their aids operating within 4 minutes. The main body came into view just 3 minutes off schedule, and the pathfinders set off their red smoke.

Similarly, the 82d Airborne Division's pathfinders, who had continued northward, were arriving over DZ "O" at the same time. A flak tower and flak wagon at Grave brought heavy fire on the pathfinders as they jumped, but escorting fighters promptly attacked and neutralized the enemy fire. The two teams dropped side by side, and since there had been no losses, the second team provided local security while the first team set up its aids. Radar and radio were operating and panels were out within 3 minutes. Serials flying to all the drop zones in the 82d Airborne Division area were dependent on the aids set up on DZ "O." Those going to DZs "N" and "T" would fly over "O" and then find their respective drop zones. Pathfinders of the 505th Parachute Infantry Regiment would drop with the first serial on DZ "N," and a team from the 325th Glider Infantry Regiment would drop with the 508th Parachute Infantry Regiment on DZ "T" to mark the landing zone for the gliders.

The following is a German reporter's description of the scene in Holland:

It was early on the Sunday afternoon of 17 September. The cinemas in the small Dutch towns were slowly filling up, and the streets and highways, along the canals and small streams, were crowded with young people on bicycles. And then out of the blue sky roared several hundred enemy fighter bombers. Their aim was to attack the German defensive positions and locate the flak positions. Barely had they disappeared beyond the horizon when, coming from the west across the flooded coastal areas, appeared the planes and gliders carrying regiments and brigades of the enemy's airborne army. . . . The troops bailed out from a very low altitude, sometimes as low as 60 meters. Immediately after that the several hundred gliders started to land. In those first few minutes it seemed as if the down-coming masses would suffocate every single life on the ground. . . .

Shortly after the landings of the British and American divisions, our reconnaissance troops went into action. By searching the countless forests and large parks in that area, cut by numerous small streams, they had to ascertain where the enemy intended to concentrate his forces; only then could a basis for our counterattacks be established. The telephone lines were cut. The reconnaissance cars could move forward only slowly. Some of the enemy dug themselves in near their landing places and brought weapons into position. Others moved up to the houses and barricaded themselves, using the furniture inside the buildings. From there they tried to dominate the bridges and beat back our counterattacks. Elements of the Dutch population assisted the enemy in their task.

Mass Drop

Masses of troop carriers and gliders flew in steady streams regardless of the intense flak. On the northern route, 1,033 troop carrier planes—408 of them towing gliders—carried American and British troops toward Nijmegen and Arnhem. On the southern route, another 494 planes—70 with gliders—flew north of Eindhoven. A fleet of 821 B-17 bombers had struck flak positions and installations with more than 3,000 tons of bombs to pave the way. Fighters—313 P-51s, 201 P-47s, and 36 P-38s—escorted the airborne columns. The appearance of flak was the signal for the fighter bombers to dive on the positions and beat it down. Although fighters encountered two groups of enemy planes near the Rhine, none ventured to intercept the columns. Another 371 fighter bombers of the RAF made cannon attacks on barges, motor vehicles, and flak positions, while 102 medium and light bombers attacked barracks at Arnhem, Nijmegen, and Ede, and 221 bombers of the Bomber Command made diversionary sweeps. No evasive action now broke up the airborne formations as had been the case earlier; now troop carrier pilots flew unswervingly to the drop zones, slowed to the proper speed, and jumped their "sticks" of paratroops in compact patterns.

The following two examples illustrate



Operation *Market* was designed to assist the 21st Army Group in cutting off German forces in Holland and in exploiting the possibility of turning both the Rhine and the Siegfried Line. Above, paratroopers loading into C-47s, in preparation for the operation. Below, paratroopers dropping near Grave, Holland.—Department of Defense photos.



something of the way the troop carrier pilots held to their courses:

1. On 17 September 1944 . . . when we passed over the British Second Army and into hostile territory the flak commenced raining on us from Eindhoven. My plane was hit in the left engine and left tail section and some of it came through the floor at the front of the plane where no one was seated. The fire became so intense that the motor cut out and we had to jump prematurely. However, the pilot held on so tenaciously that we were able to jump within the edge of the drop zone. The crew chief jumped out after we had gone (I saw him in Zon later) but the plane went down in flames. I have not learned about the pilot, co-pilot, and navigator, but I'm afraid they didn't make it—perhaps because they stuck it out for us.

2. On Tuesday or Wednesday, I am not sure which day it was, I saw three planes hit and catch fire, and the pilots, instead of saving themselves, calmly circled again, dropped their cargo, and crashed in flames.

Ground Action

Within an hour and 20 minutes, 6,000 to 8,000 paratroops dropped in each division area, and they dropped in good concentrations on their drop zones. Unit commanders in each division considered it the best drop in their history. This does not mean complete perfection—a battalion of the 101st Airborne Division landed 3 miles northwest of its drop zone (but in good formation) and some units of the 82d Airborne Division dropped on the wrong drop zone—but it was more nearly perfect than any previous drop, and about as nearly so as anything can be in warfare. In this moment, when great airborne fleets were arriving at the right place at the right time, and units were dropping in concentrations where they could attack quickly, in this moment seemed full justification for all the hours of planning and months of training which had preceded it.

101st Division

Once on the ground, the troops moved quickly toward their immediate objectives. Landing without opposition on DZ "A," west of Veghel, the 501st Parachute Infantry Regiment, less the 1st Battalion,

went for the bridges in and near that town. By 1500, the regiment had seized intact all four bridges—two highway bridges and two railway bridges each over the Willems-Vaart Canal and the Aa River. The 1st Battalion, scheduled to drop on DZ "A-1" on the opposite side of the canal, had landed 3 miles to the northwest. It ran into some scattered enemy resistance, but reached Veghel at 1700. The engineer detachment immediately began building a second bridge across the canal in order to permit two-way traffic if necessary.

More scattered in their drop (some units assembled by mistake on the smoke of the 506th Parachute Infantry Regiment), all battalions of the 502d Parachute Infantry were not assembled until 1500. Again enemy opposition failed to develop at the drop zone, and the 1st Battalion moved north to St. Oedenrode, where, after a short skirmish, it seized the town and its objective, the bridge over the Dommel River, intact. Company "H" of the 3d Battalion hurried to the southwest and took intact the highway bridge near Best. However, a strong enemy counterattack recaptured that bridge before nightfall. The other companies of the battalion then joined Company "H" and prepared for another attack on the bridge the next morning. The remainder of the 501st Parachute Infantry Regiment went into division reserve a mile north of Zon.

Without waiting for formal assembly on DZ "B," companies of the 1st Battalion, 506th Parachute Infantry Regiment—each represented by a small group of 15 to 25 men—hustled southward with the hope of getting to three bridges over the Wilhelmina Canal near Zon before they could be blown. The battalion was to bypass the town to the west, and then attack the bridges in a flanking movement along the canal. The 2d Battalion started toward Zon down the main road, with the 3d Battalion following. The 1st Battalion came

under mortar fire as it approached Zon from the west, but it reached the canal and attacked eastward toward the main highway bridge. Fire from an 88-mm gun then held up the advance until riflemen killed or captured all the members of the crew. No opposition appeared in front of the 2d Battalion until it reached the outskirts of Zon. There, a surprised German soldier rode a bicycle right into the midst of the paratroops. But then an 88-mm gun, set up in the center of the town, fired two quick rounds down the main street. A slight curve in the street protected the column while the advance party—one platoon—moved to the right, and, under the protection of surrounding houses, walked up to within 50 yards of the gun. One round from a bazooka put it out of action and a paratrooper's sub-machine gun killed the crew members. Then, as the two battalions were converging on the bridge, hardly 100 yards away, it went up in a resounding blast. (The other two bridges had been blown several days before.) Some of the leaders jumped into the canal and swam across. Most of the 1st Battalion got across then in rowboats. Engineers, building upon the central pillar which remained, improvised a bridge of ropes, thin boards, and barn doors, so that the remainder of the regiment could march across in single file. It was nearly midnight before the regiment was in position on the other side, and the commander decided to wait until morning to resume the march on Eindhoven.

The gliders, following the parachute serials to LZ "W," encountered intense flak. This was the way of an airborne operation—often it was worse for the tail than for the head. Five gliders were lost between the initial point and the landing zone when the tow ships exploded. Several gliders dropped prematurely, over the English Channel or over the Continent, and others landed deep behind enemy lines. Nevertheless, the 53 (out of 70 dis-

patched) gliders that landed safely on the landing zone brought in 252 officers and men, 32 jeeps, and 13 trailers. No artillery came with the first lift. Headquarters detachments and equipment arriving on the gliders joined advance elements who had jumped with the 502d Parachute Infantry Regiment and moved into Zon to set up the initial command post.

Meanwhile, the British Guards Armoured Division had jumped off at 1400 to attack toward Eindhoven from the south. Unexpectedly stiff opposition, however, had stalled its attack and at nightfall it still was 6 miles short of that city.

82d Division

During this time, paratroopers in the area of the 82d Airborne Division—about 20 miles to the northeast—were going about their tasks with dispatch.

The objectives for the 504th Parachute Infantry Regiment were separated by 4 miles, so that the battalions dropped on separate zones to be nearer the assigned objectives. Half an hour after dropping on DZ "O," west of Overasselt, enough men of the 2d Battalion had collected to set out for its objective, the 640-foot bridge over the Maas at Grave. Company "E" of that battalion dropped on the other side of the bridge west of Grave and worked through the ditches and canals toward the bridge from that direction. Snipers and fire from emplaced 20-mm antiaircraft guns harassed the attackers, but a party of eight men went for the bridge. They got into a flak tower at the north end of the bridge—the gunshield had been cut by strafing aircraft, but the gun was still operative—and turned the weapon against one remaining German gunner who was covering the bridge from the flat. At 1630, Company "E" fired green flares to signal that it controlled the south end of the bridge, and half an hour later men were crossing back and forth. The battalion captured Grave and estab-

lished a bridgehead to the south. The 3d Battalion set up a defense to the north. The 1st Battalion, landing to the east of the 2d Battalion, went after the bridges over the Maas-Waal Canal to the east of the drop zone. The bridges near Malden and Hatert had been blown, but the battalion captured the sites and seized intact the southernmost canal bridge at Heumen.

Except for the 2d Battalion and the regimental headquarters, the 505th Parachute Infantry Regiment landed on the assigned DZ "N," southeast of Groesbeek. It came down almost on top of some German flak batteries, and quickly wiped out the crews. The 2d Battalion came down on DZ "T" (assigned to the 508th Parachute Infantry Regiment, north of Groesbeek, but, assembling quickly, it lost no time in seizing Groesbeek as it moved southward. The battalion then assembled in reserve in the woods west of Groesbeek, and one platoon moved westward to the Heumen bridge where it contacted the 504th Parachute Infantry Regiment. Detachments of the 1st Battalion held Mook (where a railway bridge had been blown) and set up road blocks to protect the landing zone and to protect the British I (Airborne) Corps headquarters in the woods west of Groesbeek.

The 508th Parachute Infantry Regiment, after landing northeast of Groesbeek on DZ "T," moved immediately toward Nijmegen. One battalion cleared the landing zone for gliders, against considerable enemy resistance, and another occupied the wooded hill southeast of the city, against moderate opposition. This ground—the highest in Holland—had been recognized as a key terrain feature from the beginning. On the basis of a Dutch report that Nijmegen and the bridges were lightly held, a company was sent directly for the bridges. This move brought violent reaction, however, and at 2000 the attack stopped 400 yards short of the main high-

way bridge; the attackers pulled back to prepare for another attempt the next day.

The 376th Parachute Field Artillery Battalion dropped on DZ "N," assembled its howitzers, displaced 1,000 yards to its assigned positions, and, at 1800, fired its first mission on call of the 505th Parachute Infantry Regiment.

The glider serial for the 82d Airborne Division brought in 8 57-mm antitank guns (distributed 2 to each parachute infantry regiment and 2 in reserve near the division command post), 24 jeeps, 7 trailers, and 209 officers and men. Of the 50 gliders which were dispatched, all except 4 arrived at or near the landing zone (2 were destroyed, 1 dropped over the English Channel, and 1 landed 85 miles southwest of the landing zone). Despite this fact, only 33 of the gliders arrived undamaged.

British 1st Division

Troops of the British 1st Airborne Division were coming down on drop zones and landing zones 5 to 8 miles west of Arnhem. As soon as they assembled, two battalions of the 1st Parachute Brigade started by separate routes toward the bridges. Following a road near the river, the 2d Battalion got through. The railway bridge had been destroyed, but the highway bridge remained intact. One battalion got to the bridge, disarmed the demolitions, and established itself in nearby houses where it could command the northern half of the bridge. The other battalion ran into strong resistance in the outskirts of Oesterbeek, and only the survivors of one company got through to the bridge. Troops of the 1st Airlanding Brigade—actually their gliders had begun landing *before* the paratroops dropped—had their hands full in protecting the drop zones and landing zones.

The British airborne corps was unable to establish signal communications with either the 101st Airborne Division or the British 1st Airborne Division. Both the 82d

and 101st Airborne Divisions, as well as the airborne corps, did make radio contact quickly with their respective rear bases in the United Kingdom.

General Brereton sent a message to SHAEF to report that radio contact had been established with the *Market* task force headquarters at 1700; then he added: "In my opinion this operation conclusively proves fighter action against flak can reduce it to negligible quantity in airborne operations."

SUMMARY

Thus was the greatest airborne operation of the war launched. A troop carrier fleet of 1,544 airplanes and 478 gliders, American and British, had carried approximately one-half the strength of three airborne divisions (two of them over-size divisions) to widely separated areas and delivered them simultaneously. No German aircraft had intercepted the column, and the supporting air action against antiaircraft positions had been highly successful for the most part. No British aircraft had

been lost to enemy action, but flak had claimed 35 American troop carrier planes and 13 gliders. Pathfinders had functioned well, serials had arrived over their drop zones and landing zones close to schedule, and parachute drops and glider landings had been in good formation. All the units had not hit their designated drop zones precisely, but, in most cases, they had been massed and control was established quickly. That night, the 101st Airborne Division held Veghel, St. Oedenrode, and Zon, with a bridgehead south of the Wilhelmina Canal. The 82d Airborne Division was in possession of the bridge over the Maas at Grave and the bridge over the Maas-Waal Canal at Heumen, the high ground southeast of Nijmegen, and that south and southwest of Groesbeek. One force was in Nijmegen fighting toward the south end of the important highway bridge over the Waal. The British 1st Airborne Division had encountered some bitter resistance, but its 1st Parachute Brigade controlled the north end of the main bridge over the Lower Rhine at Arnhem.

NEXT MONTH

Main Articles

Notes on the Tactical Employment of Atomic Weapons by Colonel George C. Reinhardt; and *Future of Yugoslavia Under Tito* by Colonel Sam J. Rasor are included among the main articles.

Foreign Military Digests

The foreign digests include "A Criticism of Air Power Strategy" from *The Hawk* (Great Britain); and "Employment of Commonwealth and United States Field Artillery" from the *Canadian Army Journal*.

Books of Interest to the Military Reader

Reviews of *The Rise of Totalitarian Democracy* by J. L. Talmon; and *History of Marine Corps Aviation in World War II* by Robert Sherrod are included.

FLOATING HOSPITALS

THE life span of a battle casualty is determined by the speed with which he receives treatment. The combat medical services do everything possible to reach the man quickly, administer first aid, and evacuate him to a medical aid station and, finally, to a rear area hospital. In the network of land, sea, and air facilities in Korea, the Navy's hospital ships are playing a major role. In approximately 10 months, the USS *Consolation* has handled 9,398 patients. Like its counterparts, the *Repose* and the *Haven*, the *Consolation* has set a record for evacuating and treating the sick and wounded in Korean waters.

In addition to the time element, a hospital ship is faced with the problem of embarking patients. At sea, the fast breeches buoy system is used between ships. Some of the patients are evacuated to the hospital ship by a small boat shuttle system. On reaching the ship, patients are hoisted aboard by means of an electric winch which drops a wire sling and lifts the stretcher and chair-borne patients from the boat. In bad weather, this method is difficult, and stormy and rough seas make it a hazardous operation.

To speed the evacuation of the wounded, the Navy installed a helicopter landing platform on the stern of the *Consolation*.

This flight deck makes it possible for a helicopter to pick up wounded men from the front lines and deposit them aboard the modern, floating hospital in a matter of minutes.

After 2 months' service as a rear area hospital in Pusan, the *Consolation* received orders to proceed up the east coast of Korea and anchor off Socko-ri, 12 miles north of the 38th Parallel—almost within sight and sound of Communist guns. For the first time, she was within helicopter range of the front lines. With Army, Navy, Air Force, and Marine Corps teamwork, a smooth and efficient transportation system was set up. Since that time, battle casualties have been evacuated daily to the floating hospital via helicopter; total time from shore to ship, less than 5 minutes. Wounded have been flown aboard the ship of mercy during winter storms when high seas have kept all small craft ashore.

According to the *Consolation*'s commander: "The *Consolation* has demonstrated in this joint operation that helicopter flights from the fighting front to a hospital ship are no longer a theory but the most practical and fastest method of handling battle casualties. It sets the pattern for the future transportation of wounded from the battle front."

Navy hospital ships are an important link in the network of facilities provided by the Army, Navy, Air Force, and Marine Corps to speed the evacuation and treatment of battle casualties of the Korean conflict

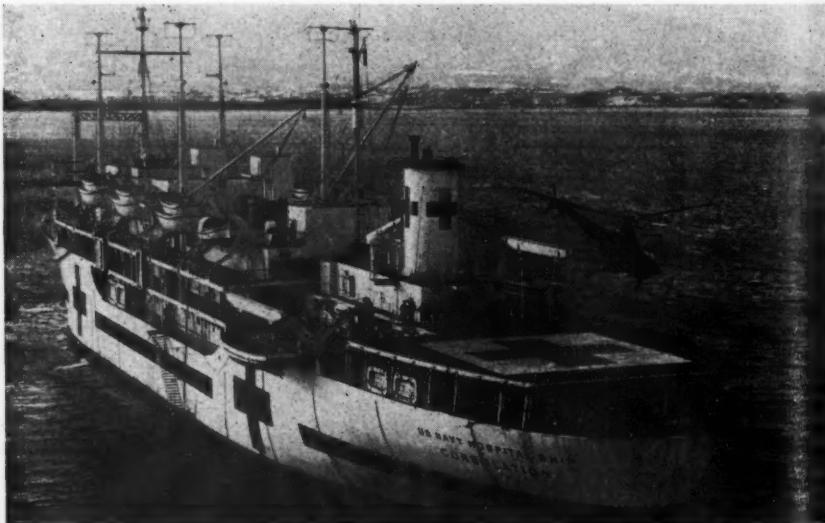


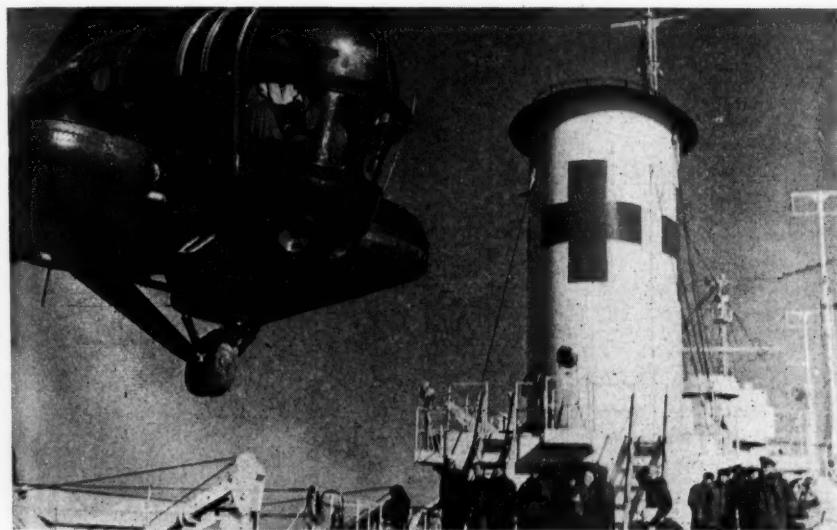
The combined medical services of our land, sea, and air forces make every effort to reach casualties quickly, to administer aid, and to evacuate them promptly. Above, a Marine helicopter landing on a marker indicating the location of a casualty. Below, bearers moving a wounded soldier to an awaiting helicopter.—Department of Defense photos.



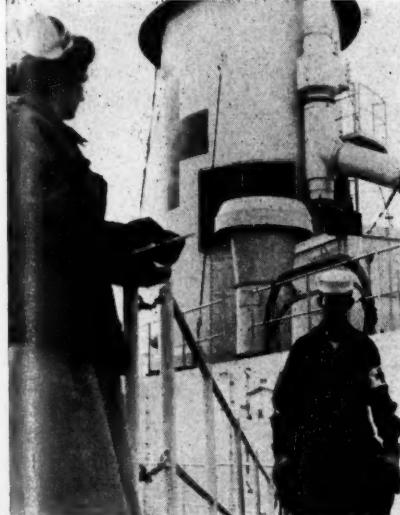


Casualties are evacuated to a medical aid station. Above left, a casualty being prepared for flight in a carrier pod. Above right, first stop is made at an Army mobile surgical hospital behind the fighting front. Below, an Air Force helicopter approaching the landing deck of the US Navy Hospital Ship *Consolation*.—Department of Defense photos.





Speed of evacuation is a primary consideration in saving lives. Above, hospital personnel standing by to assist patients as a helicopter settles on deck. Below left, a Navy nurse recording arrivals as patients are carried below. Below right, patients receiving treatment in a well-equipped physiotherapy laboratory.—Department of Defense photos.





Medical treatment aboard floating hospitals compares favorably with similar services provided in more conventional facilities. Above, a shell fragment patient having his leg dressed. Below, walking patients being served in the ship's mess, where all meals are prepared under the supervision of trained dieticians.—Department of Defense photos.



MILITARY NOTES

AROUND THE WORLD

UNITED STATES

Fiberglas Grid Sheet

Samples of a new fiberglas grid sheet have been sent to combat units in Korea and to school troops at Fort Sill, Oklahoma, for evaluation. The new material is expected to be more durable than the paper grid sheets now being used.—*Combat Forces Journal*.

Transporter Box'

The Army Transportation Corps has developed a new type of packaging; an all-steel, combination lock container. Known as the "Transporter Box," the container nearly has eliminated the inevitable pilferage and damage of long-distance hauling. It also is cutting labor costs in the transportation of cargo.

The "Transporter Box," a military adaptation of a commercial container, is relatively small, measuring only 8 feet 6 inches long; 6 feet 3 inches wide; and 6 feet 10 inches high. It has a 300-cubic-foot capacity.—News release.

Fort Sill Expansion

A 19-million-dollar expansion program has started at Fort Sill, Oklahoma. The project calls for a new 4-million-dollar academic building, 21 barracks, a telephone exchange building, and an addition to the cold storage plant.—News release.

YH-21 Helicopter

A new Air Force helicopter, the *YH-21*, recently completed its first flight.

Designed for arctic missions, the *YH-21* is capable of carrying 14 troops or 12 litters plus a medical attendant in addi-



The Air Force's new *YH-21* helicopter.

tion to the pilot and copilot. The tandem twin-rotor transport has a greater load-carrying capacity than any helicopter presently used by the armed forces.

The *YH-21* can be loaded on the ground or as it hovers in the air. A hydraulic rescue hoist will lift a man, a litter, or 400 pounds of equipment while the 'copter is in a hovering position. This permits rescue missions over any terrain.

It has a speed of 125 miles an hour, and can operate at altitudes above 16,000 feet.—News release.

M47 Tank

The Army announced recently that Field Forces has accepted the Ordnance Corps' latest armored "Sunday punch," the *M47* tank.

An intermediate model, neither a completely new nor a merely revised model of previous medium tanks, the *M47* still is



The Army's new *M-47* medium tank.

claimed to be better than anything that it is likely to face in the next couple of years.

The hull of the new tank gives it an appearance similar to the *M46 Patton*, but, according to the Ordnance Corps, the similarity between the two stops with the outside appearance.

The new tank weighs about 48 tons combat loaded, carries a crew of five, has an air-cooled 810-horsepower engine and crossdrive transmission, and is equipped with a high-velocity 90-mm gun. Other data on the new weapon have not been released.—News release.

Turpentine Lubricants

Department of Agriculture and Navy chemists have succeeded in making synthetic lubricants from turpentine.

Since turpentine is produced in large quantity in the United States, the discovery is expected to make special lubricants available for military and industrial use at substantially lower cost.—*Army Navy Air Force Journal*.

Speed Healing of Wounds

To speed the healing of a wound, whether in battle or in an operating room, the human body needs one particular chemical, a protein building block called cystine.

Experiments on rats, whose food could be controlled, demonstrated that wound healing is promoted by diet additions of cystine, or methionine from which cystine can be made in the body, or proteins that contain these substances.—*Science News Letter*.

Circuit Synthesis

Scientists and engineers are building electric circuits first on paper and then in the laboratory to get what they want to know without so much trial-and-error.

Known as circuit synthesis, the process is the exact opposite of circuit analysis, which takes an existing circuit and determines how it acts under different conditions.

Circuit synthesis, by means of a complicated mathematical process, is used to find the proper circuit elements, their values, and the way to connect them together to obtain a desired circuit which will work properly under the conditions it will have to operate.

The highly complex circuits required by modern communication equipment, radar, and computing machines create many of the problems which circuit synthesis attempts to solve.—*Science News Letter*.

Maintenance Hangars

The Air Force has designed new maintenance hangars large enough to house any size aircraft now produced or in the planning stage.

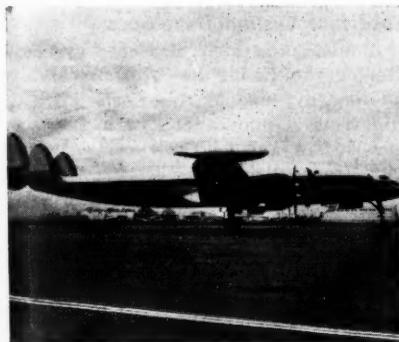
The largest of these has a ground floor dimension of 600 by 250 feet, and requires as much steam heat as would be used in a community of 250 average-size houses.

All of the hangars are of double cantilever design, in three basic sizes. The smallest size can be expanded by use of other plans.—*Armed Force*.

Wingtip Tanks for Airliners

Air travelers the world over can expect to see large fuel tanks on the wingtips of tomorrow's airliners, for they are about to graduate into commercial airline use from their present military role.

Such tanks will be necessary when turboprop engines come into commercial use,



A passenger-type plane with tiptanks.

perhaps in 1955 or 1956, because they consume fuel as much as 54 percent faster than conventional engines. Moreover, the 600-gallon wingtip tanks, standard on military planes, curb vibration and strengthen an airplane wing in flight.—News release.

New Field Telephone

Just developed, and now ready to undergo engineering tests, is an improved field set, the *TA-43/PT* telephone, intended to replace the well-known *EE-8*, the telephone veteran of World War II and Korea.

The new telephone set is lighter, smaller, and more rugged than the *EE-8*, and provides increased talking range. It is waterproof, and will operate for several miles on voice power alone without batteries. A thin handset fits comfortably beneath a helmet. It is flexible in operation, with different circuit arrangements available merely through the flick of a switch.—*Combat Forces Journal*.

'Terrible Turtle'

A one-man midget tank, whose mighty fire power could make it the scourge of the battlefield or beachhead, is now being considered by the Army.

Scurrying low over the ground at 30 miles an hour, its lone operator would trigger two .30-caliber machine guns.



Above him, as he lay on his stomach peering through front- and rear-view periscopes, would be a rocket launcher with 13 packages of explosives. His steel turtle shell would be rimmed around with 650 ports holding standard shotgun shells that he could fire electrically in all directions.

Weighing about 7,000 pounds, the tank would be 9 1/2 feet long, 2 1/2 feet high, and about 5 1/2 feet wide. The center of gravity is less than 1 1/2 feet off the ground—making it virtually impossible to turn the turtle over. The inventor claims it would be able to climb any hills a large tank can and to turn within its own length.—*Popular Science Monthly*.

Hand-Held Tracking Camera

A new hand-held tracking camera has been developed by the Naval Ordnance Laboratory (MILITARY REVIEW, Dec 1951, p 65). Flexible and nonfatiguing, the new camera makes use of a padded shoulder



The Navy's new hand-held tracking camera.

mount for steadiness and weight support, and hand grips for operation and aiming.

Its development came about as a result of studies of mine development made during World War II, when a photographic record was needed, including close-ups, of mines at high altitudes and their behavior when dropped from an airplane either with a parachute or in a free drop. Further tests have proved the camera's worth in such studies as tracking an airplane traveling at high speeds, catching the actual time of missile launching, and following the entire range of drop of the missile. It also has been used to show live parachute jumps and in ground-level studies where the angle and speed of the subject were unsuitable for a camera based on a tripod.—News release.

Atom Bombs

The director of the Los Alamos atomic laboratory in New Mexico has announced that the United States is working on new substances for making atom bombs that may be different from the uranium, plutonium, and hydrogen already known to the public.—News release.

Lubricant System Developed

A lubricant system developed by chemists of the Naval Research Laboratory allows Navy and Marine Corps pilots to fire their 20-mm cannon at altitudes of 30,000 feet and higher. Previously, the guns frequently jammed because the lubricants would solidify in temperatures of 20 degrees below zero and lower. Temperatures in this range are frequently encountered at altitudes above 30,000 feet, even in summer.

Four synthetic lubricants make up the new system: a light oil for the gun mechanism itself; a lubricant for the ammunition; a water-repellent lubricant for the electric trigger; and a grease for the mechanism that automatically feeds the ammunition to the gun. The use of the "tailor-made" lubricants has permitted nearly constant rates of firing of the cannon at temperatures from 150 degrees above zero to 70 degrees below (Fahrenheit).—Army Navy Air Force Register.

Half Life Measurement

Measuring the half life of radioactive materials when the half life is as short as one-thousandth of a second can be accurately done with a new method which has been developed.

Previous methods, such as impressing the radioactive pulse of the material on an oscilloscope, were inefficient for the short-lived materials. The present method feeds the pulses from a radioactive detector through a discriminator and a height-varying circuit to a multichannel differential pulse discriminator.—*Science News Letter*.

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Pint-Size Motor

Electric motors, only half as big as their conventional counterparts, have been developed to pack the same punch as their big sisters. That means a new-type motor weighing 10 pounds can do as much work as an old-type motor weighing 20 pounds.

The new motors should make more motor-driven appliances available to the public because of savings in materials.

The new-type motor has a more effective ventilation system and uses aluminum generously in its structural parts. A special nylon insulating material is used which is said to last for 50 years.

Using a general-purpose drive, the motor will power such machines as oil burners, fans, blowers, pumps, air conditioners, and commercial refrigeration systems.—*Science News Letter*.

Army Radar Expanded

The development of a chain radar system to make possible observation of the complete flight of a guided missile was announced recently by the Army.

The chain, set up at the White Sands Proving Grounds, New Mexico, consists of several stations along the range of strategic points. Master stations have been set up in the major launching areas, and tracking starts with the launching of a missile.

As the missile hurtles along its course, data from the master station are relayed to the first relay station, automatically setting the radar at that station so that it begins tracking the missile the moment it comes into range. The process is repeated from station to station.

Data from all of the stations are relayed back to the master station so that observers may watch the missile's flight characteristics. Photographic records are made of the radar dials and scopes.

At the end of the missile's flight, radar automatically trains cameras with telescopic lenses on the missile as it dives into the target.—*News release*.

Icebreaker Planned

A new icebreaker, larger and heavier than the types built during World War II, is slated for construction for the Navy.

This icebreaker will be a prototype vessel; future icebreakers, if constructed, will be built along lines suggested in this vessel's design.

Designed length is 310 feet, beam 74 feet, and displacement 8,300 tons. This is almost 3,000 tons heavier and more than 40 feet longer than the preceding type.—*All Hands*.

Ignition Improver

A fuel additive has been developed which improves the ignition qualities of diesel fuel.

As little as one-tenth of one percent by volume of the ignition improver is enough to raise the cetane number of many distillate heating oils within the range of commercial diesel fuels.

Cetane fuels, used in diesel engines, ignite more quickly than do octane fuels which are used in gasoline engines. The cetane number is an indication of the speed at which the fuel will ignite.

The fuel additive, called DB-36 amyl nitrate, will enable refiners to supply the required grades of diesel fuels in the needed quantities and at low cost.—*Science News Letter*.

Shipbuilding Program

Contracts or project orders have been placed for all of the 113 new ships in the 1952 naval shipbuilding program, and virtually all contracts or naval shipyard project orders have been placed for 198 ship conversions authorized under the 1952 program.

The program ranges from the 59,000-ton *Forrestal* to 115-foot utility landing ships, and it also includes the first nuclear-powered submarine and the first conversion of cruisers to guided-missile ships.—*News release*.

CANADA

Jet Air Station

Some 600 workers and about 18 million dollars are being used to carve Canada's first all-weather jet air station out of a 6,000-acre plateau 3 miles northeast of North Bay, Ontario.—News release.

INDOCHINA

Pilot Training

Four United States Navy pilots and mechanics are teaching the French how to fly the 12 seaplanes given them to help speed up the war against the Communist-led Vietminh forces. The Navy men plan to spend 3 months in Saigon, Indochina, teaching 9 French pilots and 100 mechanics.—News release.

Army Commander

The Vietnamese Army, which has been aiding French forces against the Communist-led Vietminh rebels, recently came under the command of its own general staff and Vietnamese commander.

The shift in command to native officers is in line with French policy to create an independent Vietnamese force that will be used to occupy captured areas and mop up guerrilla resistance. This will free French forces for more direct action, besides cutting down high military costs that have burdened the French home economy.—News release.

ITALY

Trade Agreement

Italy and Western Germany have signed a trade agreement for the exchange of 360 million dollars worth of goods in the next year.

Western Germany will send Italy more than 3 million metric tons of coal and iron in various stages of processing and a big range of finished or semifinished goods.

Western Germany will import 60 million dollars worth of Italian agricultural produce.—News release.

JAPAN

Merchant Marine

Japan's Transportation Ministry has announced that that country's ocean-going merchant marine has been restored to 60 percent of its prewar level.—News release.

Coal Production

Japan's Minister of International Trade and Industry has set a 1952 coal production target of 48 million tons—a 220 percent boost over tonnage in 1945. Production in 1951 was 45½ million tons.—News release.

FRANCE

Shipping Unit

France recently became a party to the convention of the Intergovernmental Maritime Consultative Organization, which was drawn up in 1948 as a means of establishing a new United Nations specialized agency in the field of shipping.—*The New York Times*.

Antiaircraft Ships

For the third or fourth time, the *De Grasse* has been remodeled, this time as an antiaircraft ship. She will carry sixteen 5-inch and twenty 57-mm Bofors in pairs, at seven different levels, and sited to give all-round concentration of fire. Her speed will be 33½ knots. The *Guichen* and *Chateaurenault*, former Italian 41-knot small cruisers, are also being rearmed as antiaircraft vessels, but without much change in profile.—*The Navy, Great Britain*.

Arms Aid

The United States Defense Department has announced that the shipment of military equipment to France under the arms aid program recently reached the million-ton mark. This figure is exclusive of the planes and ships which have been delivered under their own power.—*The New York Times*.

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GREAT BRITAIN

Jet Fighter

The *P. 1067*, widely regarded as the finest fighting aircraft available for production anywhere in the world, was recently redesignated the Hawker *Hunter* and placed on the new "super priority"



The Royal Air Force's Hawker *Hunter*.

list as a defense item of the utmost importance for the safety of the country (MILITARY REVIEW, Nov 1951, p 69).

Powered in its present form by a single Avon jet engine, the *Hunter* is an outgrowth of a line of development which began in 1945 with the design of the straight-wing *P. 1040*.

The *Hunter* is equipped with an ejection seat, but no other details concerning equipment, armament, or dimensions have been revealed.—News release.

Improved Sapphire

The concept of jet air power was revolutionized recently when it was announced that the British *Sapphire* jet engine, which for the past 20 months has led the world with a power thrust of 7,800 pounds, has achieved a thrust of 8,300 pounds—27.8 percent more than its nearest British, American, or Soviet rivals. Moreover, the increased thrust has been attained without the slightest increase in engine weight or size.—News release.

'The Squid'

Recently released for publication by the British Admiralty is the Royal Navy's new and deadly antisubmarine weapon—"The Squid." Fired from the stern, the multi-barreled mortar shoots a pattern of depth



charges right over the ship to explode 300 yards ahead.

In the top photograph, "The Squid" is being fired from the HMS *Crossbow* during exercises in the English Channel. The two bombs in mid-air are dummies; the real ones are claimed destructive enough to crush the toughest hull.

In the bottom photograph, Royal Navy personnel are loading "The Squid" on the quarterdeck of the HMS *Daring*.—British Information Services release and photos.

TIBET

Soviet Technicians

The Chinese Communists have invited Soviet technicians to Tibet to establish factories and electrical projects, supervise roadbuilding, and develop the country's gold, copper, iron, and coal deposits.—News release.

RUMANIA

Enforced Expulsions

The Rumanian Communist Government has ordered the enforced evacuation of "unproductive people" from Bucharest, and mass deportations have already begun.

According to reports, about 200,000 persons, or one-fifth of the city's present population, are scheduled to be expelled.

An official decree explained that the measures were being taken "to provide space for working people" and to "improve the provisioning of the capital."

Three broad categories of persons to be evacuated have been drawn up:

1. Families of war criminals or of those sentenced to prison or of those who have managed to flee the country.

2. Former military personnel, state officials, industrialists, landowners, or business men whose concerns have been nationalized.

3. Saboteurs, offenders sentenced under the common law, and persons under 56 who have retired.

Clearly this move is designed to "communize" the society of Bucharest and follows the pattern of the similar enforced evacuation of Budapest carried out last year by the Hungarian authorities.—*The New York Times*.

SYRIA

Friendship and Cultural Agreement

Syria and Spain recently signed a friendship and cultural agreement. Under the agreement, citizens of each country can own property and carry on commercial and industrial operations in the other.—News release.

INDONESIA

Diplomatic Relations

Indonesia's Foreign Minister has announced that that country plans to enter into diplomatic relations with Communist China and the Soviet Union.—News release.

NORWAY

Reforestation Plans

Norway expects to plant more than 36 million trees this year in its reforestation program, compared with 31½ million trees planted last year.—Norwegian Information Service.

Motor Vehicles

A total of 21,334 new motor vehicles—12,167 automobiles and 9,167 trucks—have been imported by Norway since May 1945.—Norwegian Information Service.

Defense Support

Norway is slated to receive 10 million dollars in defense support from the Mutual Security Agency during the present fiscal year as compared with 15 million dollars during the last fiscal year.

Norway's defense budget for the present fiscal year totals 150 million dollars, a boost of 35 million dollars as compared with the 115 million dollars voted for the last fiscal year.—Norwegian Information Service.

Merchant Vessels

As part of Norway's preparedness program, 670 merchant vessels have so far been strengthened structurally to permit the installation of guns in case of war. The cost is paid by the shipowners.—Norwegian Information Service.

Pay Raise

The Norwegian Defense Ministry has proposed appropriations of 25½ million kroner to raise the salaries of officers and noncommissioned officers an average of 15 percent. Allowances to conscripts and cadets also would be boosted.—Norwegian Information Service.

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AUSTRALIA

British Migrants

Since Australia's postwar migration agreement with the United Kingdom began 5 years ago, Australia has received 294,900 British migrants. The intake has progressively increased from 13,012 in 1947 to a record 73,568 in 1951, 55 percent of the total migration to Australia for the year.—*Australian Weekly Review*.

Defense Base

Australia is pushing ahead with long-term plans to turn Manus Island, in the Admiralty group about 200 miles north of New Guinea, into a bastion guarding the northern approaches to the Australian Continent.

The Americans, who built a 224-million-dollar naval and air base there in 1944, but were later refused its use by the previous Australian Government, now have concentrated their Pacific defense interests farther north and are understood to be no longer interested in Manus.

Nevertheless, the Australian defense authorities still believe that should the United States and Australia ever again be involved in war in the Pacific, Manus would be used as a joint base for operations by forces of both nations.—News release.

Australian-Built Canberra Jets

The Australian Air Minister has announced that the first Australian-built *Canberra* jet bomber will be completed in October, and that production of these planes will be speeded up in 1953.—*Australian Weekly Review*.

Salvage Operation

The British salvage ship *Foremost 17* has recovered \$225,000 worth of lead and copper from the wrecked freighter *Cumberland*, which hit a mine and sank off the southeast coast of Australia in 1917. The *Cumberland* is lying in nearly 70 fathoms of water 22 miles from Eden, New South Wales.—*Australian Weekly Review*.

BRAZIL

Japanese Immigrants

Brazil recently authorized the entry of 5,000 Japanese families into the country. The immigrants will be settled in the Amazon Valley to produce food, rubber, black pepper, and jute.—*The New York Times*.

New Locomotives

Brazil has placed orders with United States and Canadian locomotive manufacturers in an effort to speed up the modernization of her railways. Improved transportation is a major aim of the Brazilian Government.—News release.

POLAND

Palace of Culture

The Soviet Union is going to build for Poland a 28- to 30-story palace of culture and science as a tribute to Russian-Polish friendship.

The building, which will tower over others in Warsaw, will be erected by Soviet workers, engineers, and technicians, but Polish workers and engineers also will participate. It will house the Polish Academy of Science and other state bodies.—News release.

WESTERN GERMANY

Housing Construction

The Housing Ministry has announced that Western Germany plans to build about 1,800,000 new houses by 1955. Last year 400,000 apartments were built—40,000 more than planned.—News release.

THE NETHERLANDS

Radar Stations

Plans are under way for four radar stations to be set up in Rotterdam to promote ship safety and help harbor pilots guide vessels into port during foggy weather.

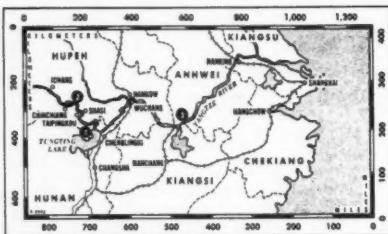
Each harbor pilot going out to guide in a vessel will carry a portable radio-telephone to keep him in constant contact with the shore based radar stations.—News release.

COMMUNIST CHINA

Flood-Control Project

According to Chinese Communist reports, more than 200,000 peasants and soldiers have started to work in Central China on a project designed to trap the floodwaters of the Yangtze River in a 355-square-mile "detention basin" just above Tungtin Lake.

The "detention basin" is being walled



A "detention basin" (1) dominated by a floodgate (2) is designed to end the flooding of Hunan ricelands to the south and protect navigation on the lower Yangtze (3).

up with earth as the main feature of a plan intended to keep the middle Yangtze from flooding the rich ricelands of northern Hunan and to protect navigation on the lower river. A floodgate exceeding half a mile in length is under construction at Taipingkou, about 50 miles below the Yangtze gorges at Ichang.

The project, which also involves the strengthening of existing dikes, the renovation of drainage systems, and the building of new sluices, culverts, and auxiliary floodgates, is under the direction of a committee headed by the Governor of Hupeh Province, which is being assisted by a team of Soviet technicians.—*The New York Times*.

Reconstruction Program

The Chinese Communists have assigned top priorities to projects concerned with "national defense and heavy industry" in their 1952 "reconstruction program" for Manchuria.—*The New York Times*.

MALAYA

Hormone Plant Killers

British land and air units in Malaya are using "hormone plant killers" to destroy Communist-led guerrillas' food sources in isolated jungle areas.

The spray, similar to the chemicals used commercially in killing insects and weeds, distorts the growth of food plants so that they become useless for human consumption although it is in no way poisonous.—News release.

CZECHOSLOVAKIA

Electric Power

The Czechoslovak Communist Cabinet has ordered a nation-wide reduction in the use of electric power. Western observers believe that the order was caused by failures of the Czech coal industry to reach its production quotas.—News release.

Travel Statistics

According to the Czechoslovak Bureau of Statistics, 19 people with Czechoslovak passports left and 11 entered the country in January of this year through the border station on one of the main communication lines from Czechoslovakia to the West. In addition, 34 travelers with foreign passports entered and 27 went out of the country.

By comparison, official statistics for May 1937 show that 154,000 Czechoslovaks and 214,000 foreigners arrived and 160,364 Czechoslovaks and 195,140 foreigners left by the same border station.—*News From Behind the Iron Curtain*.

Defense Line

The National Committee for Liberation of Slovakia reported recently that the Czechoslovak Army, under Moscow's supervision, is building a deep defense line in Western Czechoslovakia. The defense line is reported to consist of bunkers and fortresses stretching from Bratislava through the Carpathians to the Tatra Mountains.—News release.

FOREIGN MILITARY DIGESTS

The Crux of Our Peril

Digested by the MILITARY REVIEW from an article in "The Hawk,"
The Journal of the Royal Air Force Staff Colleges (Great Britain) December 1951.

THE Western world seems at last to have accepted the fact that Soviet philosophy is not as our own. Six or more bitter years of give and take—with the allies ever giving and the Soviets working overtime on "the largest grab in the world"—has convinced most of our diplomats, and a large proportion of the general public, that, to the Soviets, "co-operation" means only that everyone else must agree with Soviet ideas and to their terms. There are those in the West who took much less than 6 years to realize that our erstwhile allies never had any intention of modifying the dogma on which their policies and methods are based, and who thereafter expected them to use "any ruse, cunning, unlawful method, evasion, or concealment of truth" to gain their ends. They believed, and continue to believe, that that purpose remains as defined in the official Communist publication—*Aim*—consolidation of the dictatorship of the proletariat in one country, using it as a point of support for the overthrow of imperialism in all countries—360 million copies of which had been circulated by 1937.

Soviet Attitude Exposed

The tactics prescribed by Marx, Engels, Lenin, and certainly no less forcibly by Stalin call for direct and brutal methods.

The West could not believe, in spite of a mounting succession of rebuffs from the Soviet Union, even while our supplies were her life's blood, that any nation could approach its problems, and its neighbors and allies, with such crude naiveté. It took a series of postwar conferences and events to reveal the sinister nature of the Soviet attitude and behavior. Czechoslovakia, Poland, Hungary, Rumania, and Bulgaria in turn fell victim to the ruthlessness and simplicity of the Bolshevik approach, while by the terms of the various satellite peace treaties Mr. Bevin and Mr. Byrnes gave with both hands, if not with their hearts, because they could not get down to the level of Molotov's duplicity. However, it does seem now that in political and social spheres the allies know what to expect of the Soviets and have rearranged their broad policy and plans accordingly. We now propose to counter the threat of force with a yet bigger threat. And to this extent we have—perhaps too late, for only time can provide the answer—become realists. Yet, oddly enough, few seem to have applied the lesson to the vital problem of the rearmament program.

We hear that we must have time, measured in years, to achieve parity with the Soviet forces. At the same time, Mr. Churchill, who doubtless knows as much

about the matter as anyone else and whose views are shared at more modest levels by many thoroughly alarmed serving officers, proclaims that Britain, and all she stands for, is in dire peril and will remain so until we are strong enough to oppose the Soviets by force. The two assertions would make sense together only if our armament build-up were supported by the 100 percent effort of all involved in it, and nothing further could be done to reduce the time predicted as necessary for us to reach a state of preparedness. Is this so, however? Our armament industry, and all that supports it, seems hardly extended. Social welfare is equal partner with defense production. It should be, and more, in normal times: but should it not now step into the background? For he who doubts that we stand in the gravest danger is a wishful thinker indeed.

Individual Rights and Privileges

We have, by virtue of our greater social development, advanced to a state in which we are, in one general aspect, at a constant disadvantage with the Soviets where war-making is concerned, be it hot or cold. We cannot descend to the level of the unscrupulous methods they use. The very differences in our doctrine prescribe it so. By them, the state must be served before all else. With us, the man is paramount and the state his servant. Our long history has bred into us the democratic approach to our own and the world's problems. We no longer believe that a man's life, his wishes, or his everyday welfare should stand lowest in the scale of national values. We accept that there are points of view other than our own, and that the rights claimed by a nation remain valid for its individuals. It is not so in the Soviet Union, who is subservient to no one and whose people dare not in any way question the orders of their masters. A demagogue in the Soviet Union—be he not of the Party line—would be a crim-

inal, as would be the striker, the exponent of the closed shop, and the 44-hour-week-and-double-time-on-Sundays man. If the state wants a job done, for peace or war, no one goes slow. The penalty for defection, in this country of 200 million people, is death.

The Soviet Approach

The benefits of this strictly materialistic approach show themselves in four ways, insofar as war and preparation for it are concerned. First, they can be seen in the tremendously effective Soviet propaganda machine. Second, in the basic productive capacity of Soviet industry, where output and results are the only criterion of a man's worth, and his social welfare is very much an also-ran in the armaments race. The third manifestation is in the quality and nature of the various war-making components themselves, each of which, if past experience is to be any guide, seems to be built for a clearly defined but direct purpose, and for that purpose alone. And the last, which stands second in importance only to the propaganda campaign, lies in the Soviet philosophy of fighting, which allows much less concern for the safety and sanctity of a man's life than does the Western concept.

Propaganda

The power of Soviet propaganda behind the Iron Curtain puts Goebbels' efforts into the beginner's class. In the best Bolshevik tradition, it lies and vilifies, distorts and conceals, invents and recants. It uses any tactic which will gain its ends and it has a vice-like grip on the Soviet people. It convinces them not only that day is night, but that both are the product of Soviet genius. It steeps them in the dogma that the USSR is surrounded and is in imminent danger of attack, by the "reactionary, militarist, imperialistic forces of Capitalist aggression." It is not surprising, then, that this oligarchical machine can easily bring the Soviet peo-

ple to war, or to great and sustained effort before, as well as during, a war. We, in the West, cannot exploit propaganda to such an extent.

Industrial Control

Supplementary and akin to the propaganda machine is the Soviet totalitarian method of control in industry, the benefits of which, in peace or war, are now painfully clear to us. We have always accepted, and still accept, that, by virtue of our democratic form of life and government, we cannot get our war production into top gear until war is upon us, and that we must, therefore, always start any war at a disadvantage with our assailants if, like the USSR, they be totalitarian. Achievement of the peak effort in a democracy is a distressingly slow task, and in the last war it took years. It was fortunate that the enemy of that war was unable to defeat us during our winding-up period—though he came very near to doing so. Nevertheless, it cost us the best of the Nation to overcome our inertia, just as it had done 25 years before. We seem to be willing, though not content, to accept this heavy penalty imposed by our way of life. But how many realize that we cannot always play for time? To think defensively may be to court defeat, and with it horrors such as we have never before imagined.

War-Making Components

What of the third implication of the Soviets' philosophy, its effect on the quality of the war machines they build? There is little published evidence that that quality is any worse than ours. For example, although we do not know that the *MiG 15* is inferior in quality and equipment to our own comparable aircraft, we do know that the former is one-third lighter. We know, too, of the constant struggle to preserve the performance of our fighters by keeping their weight down. We also remember what the

Soviets did to the aircraft they were given during the last war—how they dispensed with instruments and other equipment which we thought vitally necessary to the aircraft's function. How they disregarded the maintenance schedules which to us were sacrosanct. How they climbed in and flew the aircraft before they had been told what even the essential—or what we regarded as the essential—controls were. When they did fly them, they showed a complete disregard for the niceties with which we treated even the unbendable *Hurricane*. Are those things significant? If so, what do they mean? Many would say that they merely represent a cruder viewpoint, and that the West is better off in all ways because of the higher quality of its equipment. But how far should we think of quality and refinements when we are dealing with an enemy whose very successes in aggression result from his cruder and simpler standard? How far could we, for instance, lower the safety factors of our aircraft before we reached a significant increase in losses of men and material? Some aerodynamicists have already said our margins are too high. What other refinements and equipment could we eliminate to save that all-important weight and improve our performance? Aircraft designers believe that, *vis-a-vis* the Soviets, we "over insure" in the standards that we lay down for our aircraft, and their views are shared by many in the service who have been closely connected with the design and production of those aircraft. It seems possible, furthermore, that the same argument applies to tanks and ships and other equipment of war, although, of course, the penalties here would not be so momentous as they are with aircraft.

Philosophy

We now turn to the thoughts behind the Kremlin's direction of the actual fighting. It appears that they consider only

three factors. The first is that they must win, by any means, though preferably the simplest. The second is that they have plenty of material and highly disciplined men. The third is that the state comes before the individual. The conclusion we must reach is that the Soviet Union can, in comparison with the West, well afford to sacrifice her men and material and that, unlike the allies, she will not hesitate to do so, especially to obtain a direct and quick victory. Such a conclusion is in accord with what we have seen of the Soviets in war. It indicates yet another factor which we cannot at present counter and whose implications are no less grave.

An Advantage in Warfare

The common denominator of these advantages is the unmoral (by our standards) and undemocratic Soviet approach to the business of conquering the world. All other things being equal, in the contest of diplomacy or force, the unmoral will always have the advantage over the more righteous-minded. This has been amply demonstrated by the fruits of Germany's duplicity in Europe before the last war, and the Soviet Union's succession of victories in Eastern Europe since the war ended. Where the offending nation or party is militarily inferior, its lack of scruples can be controlled, and this has been done many times in the history of the British Empire, if not elsewhere. But where the unprincipled aggressor also has the military might, the rest of the world which it wishes to swallow stands at a disadvantage which might well prove decisive. It behooves the intended victim to consider how it may adjust the balance. The more imminent the threat the quicker must be the thinking and subsequent action.

Attacking the Problem

What can we do? If we decide to adjust our principles to those of our ad-

versary, and to adopt methods similar to his, we may be accused of forswearing the very cause we have set up in opposition to him. But the alternative might be for us to be "steam-rolled" out of existence. Instead of revising our ideas, we may soon be in no position to have any ideas at all. We are not thinking of a recalcitrant tribe in a remote corner of the Empire. We are not thinking of gunboat warfare. We are thinking of an enemy who is not only fanatical, single-minded, and totally unscrupulous, but who, at the same time, is immensely strong. The threat is to the existence of Britain and the British way of life. In the light of that threat, we are justified in amending our ideas, if only until it has been checkmated.

We Must Be Ruthless

Whichever way we tackle the problem, it is high time that we became quite realistic about its magnitude. Our war industry should be getting into top gear now, and the entire Nation—services, ministries, and industry—should be working day and night until the crisis has passed. We should simplify our procedures and standards. We should stop "over insuring" on our equipment and cut down the time it takes to pass from drawing board to unit. We should think in terms of violent offense as well as defense, and be willing to be as ruthless as the enemy. We must be prepared to go to any lengths, make any sacrifice, until the Soviet menace assumes manageable proportions.

Understanding the Danger

Many will say that in this country it will not be possible to adopt such extreme measures until the first bomb has dropped on Britain. If that is true, the deficiency is that our people know not the magnitude of their danger and that their attention is on other things. They should be told about it so that they will either strive of their own accord or understand why

they must be ordered to do what is to be done and why they must temporarily accept lower standards of life and quality. If no other means will render us safe, we should resort to intense propaganda—within the bounds of truth and decency—and to the totalitarian direction of our manpower and materials that this facilitates. This is no time to be squeamish, with the Communist purpose as clear as was Hitler's for anyone who cared to read it in *Mein Kampf*, 21 years before his plans went awry.

Conclusion

We spend a lot of time considering what are known as the principles of war.

It may well be that for future wars, hot or cold, against formidable, single-minded, and dishonest opponents, we shall have to include a further principle which requires us to alter our national philosophy to counter that of the enemy. It may even be considered as the basis, whose suitability we must adjust where necessary, upon which our principles of war must stand. Certainly, in the last 16 years, the democracies have paid dearly for failing to be as unscrupulous and forthright as their enemies. And today, for the very same reason, we stand again at a great disadvantage, this time with the most formidable adversary the world has yet seen.

Artillery in the Defense on a Wide Front

Digested by the MILITARY REVIEW from an article by Lieutenant Colonel F. R. Evans in the "Australian Army Journal" February 1952.

WHILE the infantry aspects of the problem of defense on a wide front have been covered quite adequately in the various military publications, little information has been provided concerning the effect of wide fronts on the employment of the artillery. It is the object of this article to analyze some of the associated problems.

In order to gain a better insight into the problems of defense on a wide front, it is well to discuss the term "wide front," as covered in *The Infantry Division in Battle*:

The frontage which an infantry division may be required to hold may vary from a more normal frontage of 4 to 5 miles to a much wider frontage, depending on the nature of the country and other considerations.

When holding extended frontages, the divisional commander must resist any inclination to cover the whole frontage by small-arms fire, since by doing so he will be unable to retain a sufficient counterattack force under his own hand. It can be taken as a principle that the wider the frontage, the greater must be the depth.

Little effort is needed to appreciate that

the requirements for depth and breadth at the same time conflict.

Examining the Tasks

As a first step then, an examination of the artillery tasks to be done may be appropriate and these are listed as follows:

1. The support of troops providing the divisional screen.
2. The support of the forward defended localities (FDLs), including patrolling.
3. The support of the counterattack force.
4. Defensive fire in depth, and for the counterpenetration.
5. Harassing fire.
6. Neutralization of hostile guns and mortars.

All of the foregoing tasks except 5 and 6 may call for close support.

Technical Limitations

Some of the technical limitations of the equipment should also be appreciated, so

that their influence on siting is related to the tactical requirements.

Range and Dispersion

With the 25-pounder, although it can fire to 13,400 yards with super charge, at this range the length zone (dispersion pattern) of the gun is 600 yards using mixed lots of propellant. Where the safety of our own troops is involved, a zone of more than 250 yards is undesirable. Furthermore, the firing of super charge should be restricted to special circumstances, and guns sited to perform foreseeable tasks with normal charge. Therefore, the maximum range for close support of infantry is about 8,200 yards.

Another factor to be considered before deciding on a suitable gun area for the main battle is the depth to which patrols would have to be supported. This would, of course, depend on the tactical situation and the nature of the country, but for discussion, a depth of 1,200 yards is taken and guns sited approximately 8,200 yards in rear. This means that gun positions would be about 7,000 yards from the forward defended localities.

From the same positions it may be possible to support the divisional screen, but if not, some guns would be required forward of the gun area until the screen was withdrawn.

Frontage and Depth

With guns sited approximately 7,000 yards from the forward defended localities, the maximum frontage that could be covered by all guns with the desired accuracy is about 8,400 yards.

As the frontage increases, to achieve the same effect, the guns must necessarily be sited closer to the forward defended localities. This presupposes that the guns are concentrated into one gun area, which is desirable from the point of view of control, communications, and survey. However, to counter the increased possibility of penetration of the forward defended

localities, the guns would have to be sited farther back. Additionally, there is the support for the counterattack force which in the circumstances under discussion would be positioned farther back than normally. This then calls for some artillery being sited even farther back.

Gun Areas in Depth

Obviously, it will not be possible to meet all these requirements from one gun area. Consequently, gun areas in depth must be found.

If this is done, then those guns sited for the support of the counterattack force may not be available for many of the other tasks, and all guns would not be available for all phases of the defense.

Alternatives

The alternatives to this are: To make field artillery more tactically mobile so that it can change position during the battle; or site the guns to the flanks so that, in addition to covering the forward defended localities, their arcs of fire come far enough into the defense position to provide the requisite depth for the support of the counterattack force and the provision of counterpenetration fire.

The first alternative may be possible under certain circumstances, particularly when self-propelled equipment is available, but, in most cases, it would be undesirable, as the guns may have to move at a vital moment in the battle. Nevertheless, some movement within the sector to alternative positions will be necessary for security and deception, so tactical mobility is still an important requirement.

With the guns sited to the flanks, the entire front could probably be covered to sufficient depth, but all guns would not be able to cover the entire front. However, sited in this way, positions would normally be obtainable from which the counterattack could be supported, and counterpenetration fire from the same positions provided. There may be technical difficulties

connected with firing at the shorter ranges, such as crest clearance and danger to our own troops, but careful siting should lessen these disadvantages.

By positioning guns in this way, and thereby provide depth to the fire by large switches rather than by alterations in range, a large demand for observation posts is created which will at times be beyond the capacity of a field regiment to maintain. However, by the co-ordination of observation posts of all regiments and of the divisional locating battery and the corps locating regiment, a satisfactory solution should be possible on most occasions.

Dispersed Gun Positions

It should be noted here that for the most effective fire against large troop concentrations, the gun positions should be widely dispersed. However, for the close support of our own troops, it is desirable to have the guns which will be firing closest to our troops sited directly in rear. Consequently, once dispersion is accepted, positions will be required on both the flanks and near the center of the divisional sector.

The medium artillery will be concerned mainly with harassing fire and counter-bombardment tasks. Normally, with only one gun area in the division, it is often difficult to find positions far enough forward for the medium and heavy artillery to develop their best shooting ranges. With the field artillery dispersed, suitable positions should be more easily found.

Threat From Air Attack

So far, the effect of penetration is the only enemy activity that has been related to the problem of siting guns. In addition,

the effect of air attack and counterbombardment should be considered and in both cases better protection will usually be achieved by dispersion. Against ground attack, the tendency will be to try to find positions which will be protected by the disposition of the defending infantry. It will seldom be possible to occupy positions affording complete protection, and so, in addition to fulfilling the requirements previously mentioned, the sites must be suitable for local defense against penetrating infantry and tanks.

Summary

In conclusion, therefore, the main features peculiar to this type of defense may be summarized as:

1. A reduced number of guns capable of covering the entire divisional front.
2. Guns dispersed in breadth to cover the forward defended localities.
3. Flank guns sited with large arcs to enable them to engage targets inside the divisional sector, as well as to support the forward defended localities.
4. Guns sited in depth to provide close support for the counterattack force and to counter any deep penetration.
5. Dispersion for security and deception.
6. Fields of fire for local and antitank defense.
7. Co-ordination of all observation resources to enable the large arcs referred to in 3 above to be adequately covered.
8. A high degree of tactical mobility for quick redeployment and the occupation of alternative positions to avoid neutralization by hostile counterbombardment.

Finally, it is stressed that such dispersion does not depart from the principle of centralized control.

War—Professional or Amateur?

Digested by the MILITARY REVIEW from an article by Major Reginald Hargreaves in the "Journal of the Royal United Service Institution" (Great Britain) November 1951.

If we are to have onfalls and escaladoes, let me have men who are proven swordsmen and masters of the whole art of warre, not homely wits fresh from the fields, nor tinkers from the hedgerows, nor lackeys, nor runaway 'prentices, nor out-of-time drawers newly from the stews.—Sir James Turner (1615-83).

IT WAS during the 'tween-war years when that master among military historians, the late Sir John Fortescue, gave it as his considered opinion that, "In truth war, an ugly thing at the best of times, is rarely so inhuman as when waged by amateurs. It is difficult enough to keep disciplined men in hand when flushed by victory or demoralized by defeat; but with undisciplined men and untrained leaders the task is impossible. Above all, however admirable the intentions, the curse of amateurism handicaps the hostilities-only warrior at every turn, to the constant detriment of all he undertakes, as to the grave minimization of his own chances of survival."

Fortescue was writing with the experience of the campaigns of World War I fresh in mind; and with all the expert's lack of sympathy for the straggling, wasteful unprofessionalism which is the invariable accompaniment of any departure into the chaotic realm of total warfare.

A preference for the limited liability involved in the type of warfare fought exclusively by professionals is only to be expected of the historian whose study of his subject has left unimpaired his instincts of pity and compassion—not to mention his preference for economy of means to attain a given end.

For it is clear that war of the totalitarian pattern, by the very virtue of the expansion-enforced amateurism with which it has to be prosecuted, must always exact an enormous volume of unnecessary sacrifice in life, treasure, property, and raw material. Equally, it ends in so much

all-round destruction that the victor finds himself little less the victim of the holocaust than the vanquished. In effect, "to make a desert and call it peace" is the supreme achievement of twentieth century technology as applied to war. It would almost seem time, therefore, for the world's dictators of military policy to abandon the self-shattering technique of total war and get back to David's sling or even the sharpened sticks which our primordial ancestors found perfectly adequate for the settlement of their quarrels. However, the hope that they will do anything so eminently sensible is, of course, entirely illusory. They could never trust one or other of their number not to go back on the bargain and produce a nice long javelin—or a phial of lethal bacteria—at the moment most advantageous to himself.

War Defined

War can perhaps be most conveniently defined as the attempt by one group of individuals to get the better of another by drastic means. Until relatively recent times, the tribal or national group was content to confide the responsibility to a limited number of specialists, drawn from its ranks and specifically trained for, and conditioned to, the performance of the task. The ancient Persians, Greeks, and Romans had their professional armies, who departed on their (more or less) lawful occasions, leaving the bulk of the population to carry on with the business of running the country, in their absence, on lines that differed little from those pursued in times of peace. The Goth and Vandal hordes that swarmed out of the

dark forests of the West trailed a train of womenfolk and camp followers in their immediate wake, as did the terrorizing Genghis Khan. But in their respective homelands, tribal life pursued its normal round in no way affected by the absence of the cream of its fighting men. Again, it was only the hardiest and most battle-worthy of the Norsemen who sailed down from the mists of Ultima Thule to raid an ill-organized England and thrust home their forays against Gaul's tempting seaboard, even to the gates of Paris itself. Indeed, only well-trained and thoroughly experienced warriors could have hoped to have carried such venturesome and perilous expeditions to success.

Rules of War

By medieval times, strongly influenced as they were by the ameliorating influence of the church, the prosecution of warfare had been reduced to what virtually amounted to a code, a set of rules and regulations, an elaborate digest of permissibles and unpermissibles. It is to this carefully defined dogma that modern legalists refer—with a wistful nostalgia which can only be regarded as unconsciously ironic—as “the customs and usages of war.” The right of the wounded and of prisoners to fair and honorable treatment—pending their ransom, on terms to be mutually agreed—the immunity of the civilian from spoliation and injury and the security of his goods from pillage or seizure, save against payment; the sanctity of consecrated buildings and their exemption from *brandschatzung*, the customary indemnity levied on any town or stronghold that had resisted but ultimately yielded to assault—all these measures were insisted upon with the high purpose of transforming the erstwhile courageous but brutal Pagan fightingman into the idealized Christian knight of chivalry, “uniting all the force and fire of the ancient warrior with something of the tenderness and humility of the Christian saint.”

That was the ideal, and if—like many another lofty concept—it was not always fully attained, the effort to live up to it at least ensured that some of the worst of war’s enormities were avoided, since they were officially regarded as taboo and, if indulged in, were susceptible to heavy penalization.

In effect, a great deal was done to restrict the more outrageous barbarities and accompaniments of war by means of a church-inspired and generally accepted code of rules and sanctions. The object of *The Peace of God (Pax Dei)*, first heard of in A.D. 990, for example, was the protection of ecclesiastical buildings, clerics, pilgrims, women, children, and the peasantry generally, from the ravages of war. In 1027, the Synod of Elne initiated *The Truce of God (Treva Dei)*, whereby all warfare was suspended from noon on Saturday until dawn on Monday. Subsequently, the period was extended until no martial activity was essayed from Wednesday evening until Monday morning, which, of course, gave everybody an excellent opportunity to cool down. Later still, at the Council of Clermont of 1095, Pope Urban II—the prime sponsor of the Crusades—“proclaimed a weekly truce for all Christiandom, adding a guarantee of safety to all who might take refuge at a wayside cross or at the plow.” Rules of conduct securing immunity from interference for any “chamber or lodging where a woman lay in childbed”; with the implements of husbandry; and even with “apple trees, pear trees, nuts,” or “any other trees bearing fruit” were—the more general ordinances—for the most part faithfully observed. Nor was the privileged position of the scholar overlooked; for throughout the entire period of the Hundred Years’ War the exchange of students between the Sorbonne and the Oxford Colleges was maintained without the slightest let or hindrance. Safe-conduct for the would-be man of learning was assured.

With the church exercising repressive powers through such sanctions as excommunications and interdict, and with the heads of nations devout disciples of the *mystique* of "chivalrous warfare," such mitigations of conflict's more ferocious tendencies could be, and were, generally imposed. Thus, to cite one instance only, when the hard-pressed English forces were frantically seeking a ford across the Somme River on the eve of the battle of Crecy (August 1346), King Edward could still find time to halt and hang 20 men, caught red-handed in the heinous offense of pillaging the rich abbey of St. Lucien, near Beauvais.

A Glorified Tourney

It is also to be borne in mind that with the high cost of armor, and with the subsistence of large bodies of men-at-arms prohibitive for any real length of time, in days when wealth was rationalized in terms of land, static property, and livestock rather than in minted coin, the tendency of warfare was to become aristocratic, to develop along the lines of a sort of glorified tourney, with just that much aggravated risk of injury. It followed that to maintain this aristocratic exclusiveness and in so doing to narrow war's scope for mischief, a sharp eye was kept on weapons which threatened not only to add to war's lethal potentialities, but to "proletarianize" it, and in so doing pile up its cost and add immeasurably to the risk of its becoming too all-embracing. Thus, in 1139, the Second Lateran Council strongly forbade the use—save against "paynims and infidels"—of the dastardly mechanized device known as the crossbow, or abalest, "as a weapon hateful to God and unfit for Christians." And although the crossbow—cherished weapon of the fumble-fingered—gradually insinuated itself into wide acceptance, it continued to be frowned upon by all those who still regarded warfare as something to be circumscribed within the limitations imposed by chivalry.

Gunpowder and Warfare

With the appearance of gunpowder and the realization of all the lethal horrors it embodied, instant efforts were made to control, if not definitely to prohibit, its use in war; save, possibly, in sieges. The views of the more reactionary—or more humanitarian—soldier on its introduction to the battlefield are perfectly expressed by Shakespeare, in his character's vigorous protest against the fact, that, unrebuked,

This villainous saltpetre should be digg'd
Out of the bowels of the harmless earth,
Which many a good tall fellow has destroy'd
So cowardly. . . .

In effect, there was an urbanity about medieval methods of waging war which, while fully accepting it as axiomatic that some quarrels could never be settled save by the arbitrament of arms, recognized with impartial clarity that there were other, conterminous activities in the world with an equal right to existence, and with whose pursuit conflict had no conceivable right to interfere.

The Wars of Religion

However, religious influence and inspiration, once so valuable as a restraint on warfare's more barbarous tendencies, with the violent sectarian schism begotten of the Reformation, became at once the source of a malignant fanaticism which gave to the subsequent wars of religion a quality of bestial ferocity as all-embracing as it was relentless. For if there is one type of conflict more envenomed, more ruthless, and more implacable than civil war, it is the war between irreconcilable religious creeds. *In these days that can be translated as ideological beliefs.*

The breakdown in Papal authority, however desirable it may have been in some respects, had the dire effect of un-gating a boiling torrent of factious enmity, which reached full flood in the ex-

terminatory Thirty Years' War (1618-48) fought out in Bohemia, Denmark, and Eastern Germany. Never has conflict been characterized by more wanton savagery and ruthless, wholesale butchery, more unconscionable abuse of force. "Do you think my men are nuns?" demanded the iron-fisted Tilly, when reproached with having put to the sword some 30,000 of the hapless inhabitants of Magdeburg. Small wonder that Central Europe was reduced to an arid wasteland; that from first to last the death roll amounted to 12,000,000; that in Bohemia the population sank from approximately 2,000,000 to a mere 700,000; that in one district of Thuringia where, in 1618, had stood 19 villages of 1,717 dwellings, by 1649 no more than 627 tottering, smoke-blackened habitations remained, giving precarious shelter to 319 out of the 1,773 families who had originally lived in them. It was a grim seventeenth century anticipation of the uninhabited, totalitarian "ideological" wars which the twentieth century was destined to endure on an even greater scale.

Formality in Warfare

Possibly appalled by the grisly lengths to which carnage and license had been permitted to run, the late seventeenth and early and mid-eighteenth centuries—with their strictly professional soldiers leading almost exclusively professional armies—reverted to a formality and punctilio of procedure in warfare, in which the rights of prisoners, the wounded, and the noncombatant inhabitants of the terrain over which the conflict was being fought again became the subject of the most elaborate protocol for the most part most faithfully observed.

At the same time, the technique of warfare assumed a patterned, set-to-partners routine which sought rather to disadvantage and immobilize an opponent by masterly maneuver than to seek a decision by a full-scale, all-out clash of arms.

A Battle of Wits

The ranks of the opposing fighting forces, unencumbered by huge additions of hostilities-only conscripts, were sternly disciplined and, according to the standards of the day, were of high soldierly accomplishment. It was not the object of the antagonists to annihilate each other. Far from it. It was rather their constant endeavor to try to out-wit an opponent and inveigle him into what both parties were prepared to agree was a technically impossible position, and then cry "checkmate." As late as 1740, for example, Marshal Saxe was constrained to pronounce: "I am not in favor of giving battle, especially at the outset of a war. I am convinced that a very clever general can wage war all his life without having to fight one." Massenbach wrote admiringly of Prince Henry of Prussia, brother of Frederick the Great: "More successful than Caesar at Dyrrachium, greater than Condé at Rocroi, he, like the immortal Berwick, won his victories without battle." The earlier Tallard, Boufflers, and Villeroi were of the same "military quadrille" school of thought; and their fretful annoyance with the Duke of Marlborough, who successfully sought decisions by full-scale battle-fighting, was as intense as the defeat they suffered at his hands was unequivocal. For the god of their idolatry had been that medieval reincarnation of Fabius Cunctator, Gerard de Rousillon, whose boast it was that he had "waged the campaign 5 years without meeting once," so careful was he to observe the contemporary doctrine of warfare which counseled avoidance of the pitched battle, in favor of raids and ambuscades designed to debilitate and impoverish enemy resources.

The War of Independence

To the extent that the American War of Independence was embittered by the rancor peculiar to civil war, the traditional

restrictions and sanctions, the time-honored "customs and usages of war," were occasionally abrogated. With regard to the treatment of prisoners, neither side had any particular cause for self-congratulation. However, as was perhaps only to be expected, the British were the principal sufferers; being subjected, on occasion, to outrage and mishandling at which a medieval noncombatant would have been both amazed and horrified. However, in the main, the earlier champions of chivalry would have found remarkably little to warrant criticism. It is certain that they could have given nothing less than their heartiest approval to Major Patrick Ferguson for refusing to take advantage of a sitting shot, when Washington, all unconsciously, came within such tempting range of the Scotsman's newly invented and remarkably accurate rifle. Equally, they would thoroughly have commended the soldierly restraint and dignified consideration exhibited by the men of Gates's victorious army in their acceptance of the surrender of their arms by "Gentleman Johnny" Burgoyne's sadly battered troops at Saratoga. In their bearing, the men who had conquered afforded a living proof of the validity of Norman William's dictum, that "The man who can command himself can command victory."

Total War Recognized

It was with the outbreak of the worldwide struggle begotten of the French Revolution that the principle of total war found full and unqualified recognition, by the leaders of a nation which had exultantly flung chivalry into the sawdust to keep bloody company with the heads that rolled so endlessly from the guillotine. A *levée-en-masse* placed the entire manhood of the Nation at the disposal of the military authorities; industry was brought under control, and in a number of instances—as in the case of many of the foundries and small-arms factories—op-

erated under state direction. Requisition on lines little distinguishable from confiscation was universal; while "direction of labor" (to employ the mincing jargon of more modern times) threatened seriously to interfere with the tireless spate of bombastic café-oratory, the endless patriotic parades and processions, and the enthusiastic, if indiscriminate, slaughter of class enemies, to which the bulk of the population would have much preferred to have abandoned itself.

In fine, the unwieldy mass of *fainéant* conscripts herded on to the frontiers would have proved easy game for any antagonists less handicapped by an outmoded technique of warfare than the Austrians and Prussians who actually confronted them. Thus, ample opportunity was afforded the French Military Department to catch up on that time lag which is the bane and curse of all hostilities-only forces improvised after the outbreak of conflict; when the military leaders are under the necessity of *creating* their armies before they can lead them in action in the field. With the allies "pottering about frontier fortresses," long months were given to the revolutionary forces in which to acquire some rudiments of discipline, to achieve an elementary integration, and, by sheer weight of numbers, to close the road to Paris, which, in the early days, had beckoned the Austro-British so invitingly. The chance of swift and chastening victory had been flagrantly frittered away, and totalitarianism given full scope to develop momentum. As a consequence, the world was committed to 22 years of bitter, fantastically costly, ideological warfare, distinguished by a savagery and a contemptuous disregard for those "customs and usages of war" by which strife's worst excesses—save in the wars of religion, already mentioned—had hitherto been held in check.

A Return to Barbarism

For example, in May 1794, the French

National Convention circulated an order by which they decreed that "Henceforth, no quarter shall be given to any British or Hanoverian troops," whether battle-casualties or prisoners. Fear of reprisals did something to mitigate the enthusiasm with which the French rank and file carried this *directive* into effect; but the fact that the responsible authorities had authorized its promulgation was sufficient indication that total war was to be fought on lines of barbarism generally regarded as beyond the pale.

Moreover, although the machinery of government in France might undergo change of pattern, warfare continued to be conducted with a ruthless ferocity which combined the blood thirstiness of a Tartar horde with the pitiless spoliation of the defeated more usually associated with avowed banditti.

Napoleon's rallying cry to the ragged, starving rabble composing the so-called Army of Italy in 1796—"Soldiers," he fulminated, "across these mountains lie rich lands, food, drink, and clothes. All is yours if you arrive where I direct and follow me where I shall lead"—was the prelude to an orgy of slaughter, rape, terrorization, and unabashed robbery, such as the unhappy land of Italy had not experienced even in the days of the free companies of the Renaissance.

Customary Rights Reserved

Within 3 years, the same unscrupulous leader was massacring his prisoners at Jaffa, and lightening his retreat from beneath the stubborn walls of Acre by poisoning those of his hospital patients who were suffering from plague, and whose transportation would have impeded his rate of march. After which, the wholesale internment of every foreign national, of any age as of either sex, caught in France by the unheralded rupture of the Peace of Amiens in 1803, was no more than might have been expected. Under the elastic provisions of total warfare, "the customary rights and

usages" of the captured, the sick and wounded, and the innocent noncombatant are to be regarded as no more than frivolous pedantries, to be thrown incontinently into the discard.

"Total" warfare, as practiced by the French between 1793 and 1815, was *au large* as ruthless and all-embracing as contemporary facilities, in the way of lethal weapons and other means of spoliation and destruction, could contrive. And with vast conscript armies, for the most part desperately in need of discipline and training in arms, the cost, in life and lasting injury, inflicted on the actual combatants was consistently out of all proportion to the magnitude of the operations undertaken. For the untrained soldier is little more than an alluring target for the bullets of his opponent.

A Lack of Training

During Napoleon's "last ditch" campaign for the defense of France in 1814, for example, conscripts of the Young Guard were found to be entirely ignorant of how to load and fire their muskets or perform the simplest of deployments; and were mowed down in droves in consequence. Furthermore, at the battle of Laon (March 1814), General Drouot, an old artilleryman, was forced to get off his horse and show the cannoneers how to lay their pieces; with equally costly outcome. Totalitarianism had got down to the scrapings of the barrel with a vengeance; and bitterly those untutored hordes paid for being dragged, all uninstructed, into the fray. The French column *versus* the British line, persisted in to the very last, at an enormous toll in casualties, was an open admission of the employment of ill-trained troops, too shaky in morale and too wanting in professional skill to be trusted to advance in open order. In consequence, the professionalism of British volley firing brought low an appalling proportion of the inept, unpracticed masses into which it was poured. The Peninsular

War—which may be taken as an average example—cost the French approximately 200,000 in dead, wounded, and captives, as against an allied loss, in dead, wounded, and missing, of between 60,000 and 70,000. Considering that both sides fought with weapons whose lethal quality showed little advance on those employed by Marlborough and Tallard more than a hundred years earlier, total war was really not doing so badly!

Improved Weapons and Mass Slaughter

It was with the invention of breech loading and automatic rapid-fire weapons, with smokeless powder and more powerful propellants, that the possibilities of mass slaughter on a gargantuan scale became realities; realities which became even more dreadful possibilities with the progressive perfecting of self-propelled armored fighting vehicles and guns and the airplane; the invention of poison gas; the arrival of the atomic bomb; and all the unimaginable horrors that will presently accompany the introduction of bacteriological warfare. With the incredibly destructive byproducts of the factory and the chemist's laboratory deployed by vast conscript armies which—with every possible deference to their courage and fortitude—only in the penultimate stages of a war acquire sufficient mastery of their death-dealing instruments and the tactical methods of their employment to use them with the essential economy of effort, with selective aim, and with unwasteful efficiency, war can truly be said to have reached the apogee of high-gearred, self-immolating imbecility.

Amateurism Is Costly

Swamped by the infinitely intricate lumber with which war has come to weigh itself down, and hobbled by the inveterate amateurism that fundamentally civilian-minded conscript armies carry about with them like an ineradicable stigma, pro-

fessionalism finds itself stultified, imperfectly apprehended, or just willfully disregarded, at every turn. In consequence, the nation-in-arms becomes more and more doomed to self-destruction in an effort to win a victory so costly to the vanquished that the victor ultimately finds himself committed to footing two-thirds of the bill incurred by the shattered enemy in his effort to fill a political vacuum by winning back to some sort of life.

Professionalism Is Required

This, of course, is the last word in the *reductio ad absurdum*; yet, at the same time, it has proved, so far, the ineludible corollary to indulgence in the rank imbecility of total war.

Yet, how can a departure into what in the future threatens to be nothing less than mass suicide—if permitted to go its old untrammeled way—best be prevented?

The only hope, it seems, lies in an insistence on the highest possible degree of professionalism in both the regular forces and those forces of reserve by which the first-named would, in all probability, have to be supplemented. With the paralyzing speed with which the unheralded hostilities of the future will get off the mark, there will be no time lag in which the polishing of the blade can be gradually effected: victory will go to the side that can hit first, hit hardest, and keep on hitting.

Twice is he armed who has his quarrel just:
And three times he who gets his blow in first!

Where the democratic countries are concerned, fully fledged preparation for war is, of course, against all precedent. Behind the shelter of a small professional army, ruthlessly sacrificed to a bias in favor of dilatoriness, it has hitherto been their habit leisurely to buckle on sword and armor, as a preliminary to setting about the task of expanding an extremely limited knowledge of their respective uses. The

future will demand complete mastery of their capabilities from the very outset.

The Element of Speed

In horde warfare—the most likely form of conflict in which the forces of the Western powers are likely to find themselves involved—the speedy victory which is vital to healthy survival can only be attained by the more efficient use of better weapons than those employed by the opponent, by a more alert and resourceful battle technique, by the deployment of maximum power at the first alarm, and by the most ruthless endorsement of Bedford Forrest's grim dictum that "War means fighting, and fighting means killing." For the alternative to swift and successful battue-shooting is submergence through sheer weight of numbers.

However, although the business of all-out preparation for such an eventuality is their primary responsibility, it is not a matter over which the services themselves can exercise exclusive control. The decisions which make the onerous task of the services possible rest, in the last analysis, with the Civil Executive; whose actions are to be presumed to reflect the general will of the people—all of them, including the most numb-witted, perverse, and hard to convince; who, by the same token, are usually the most vociferous.

Finding a Solution

To foot the bill, during the years of so-called peace, for the upkeep of a fighting force of maximum professional efficiency and adequate strength, is a form of insurance whose premium the average citizen—let alone the crank—has always been reluctant to pay. It is only when the house is well and truly ablaze that the bitter realization is borne in upon him that such policy as has been paid up will prove entirely inadequate to cover the loss with which he is threatened, which, indeed, he has already incurred. For post-outbreak improvisation can never be a satisfactory corrective to prewar neglect; while its staggering cost makes demands on the citizen's pocket far more drastic than would have been entailed in the steady, continuous build-up of a fully fledged fighting force of all arms, trained to a hair, and masters of the very finest weapons that ingenuity could devise and money purchase.

Surely the time has come for even the most ostrich-minded to realize that every probability exists that in a war of the future the last battle will be the first, as the first battle will no less be the last. In such circumstances, it should be clear to the most obtruent that there is no capital outlay which pays better dividends than invincibility.

Alpine Air Force

Digested by the MILITARY REVIEW from an article by
William Green in "Canadian Aviation" February 1952.

ALTHOUGH firm believers in preparedness as the strongest deterrent to any aggressive power, the Swiss look upon war as an unpleasant phenomenon peculiar to other, and perhaps less civilized, countries. It is a far cry from the days when Swiss mercenaries, among the best professional soldiers in Europe, were Switzerland's

chief export. However, although the present total population is little more than 4 million, the Swiss can mobilize 550,000 trained men within 2 days.

The terms of the Swiss Confederation forbid the maintenance of a regular army, but every Swiss male between 20 and 48 years of age undertakes regular periods

of training with the Army or Air Force. It is a strange fact that no provision is made for alternative service for conscientious objectors, but if a man is exempt from military service for physical reasons, he must pay a military tax, and failure to meet the tax for conscientious reasons, like refusal to serve, results in repeated



The Swiss-built *P-2* advanced trainer.

imprisonments, and often in expulsion from his canton.

Rarely are there more than a few thousand men in uniform at the same time and it is unusual for the Army's share of the Federal Military Department's estimates to exceed 3 percent of the national income.

The Swiss Air Force, however, which recently embarked upon an extensive 5-year program of modernization, is biting deeply into the military budget. The estimates for the 1951-52 fiscal year amount to 470 million francs to which is added the first installment of the 5-year plan which provides for the additional expenditures of 1,460 million francs.

Expenditure for aircraft procurement is included in the largest Air Force estimates of 56 million francs, and the largest proportion of this amount is to be spent on the manufacture of 100 De Havilland *Vampire Mk.6* fighters. The Swiss armament program stresses the acquisition not only of tanks and antitank weapons, but also of heavy guns for the anti-aircraft defenses and of early warning radar equipment. The sum of 160 million francs set aside for this purpose also covers the cost of building underground hangars and workshops for the Air Force.

Although small when compared with the

air arms of the larger European countries, the Swiss Air Force is highly trained and well equipped.

The first Swiss military flying unit was formed in 1914, and, by the end of World War I, aviation had become an important part of the Swiss defensive system. Until 1936, expansion proceeded slowly, but, in that year, the Swiss Air Force was reformed as an independent service, equal in status to the Army.

The Air Force, at present, possesses some 400 aircraft and comprises four air regiments, each of which consists of six to seven squadrons. The air regiments are divided into fighter, fighter bomber, and tactical reconnaissance groups, each group consisting of three squadrons with reserve flights. The nucleus of the Air Force is formed by Air Force schools, a training group based at Dubendorf, and the usual ancillary services.

Solve Special Problems

The Swiss Air Force has had to solve numerous problems arising from the top-

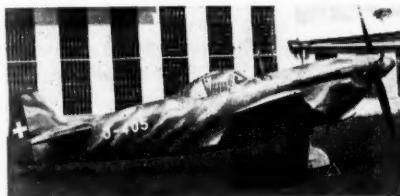


The *C-3604* attack-reconnaissance plane.

ographical and atmospheric difficulties of Switzerland's terrain. In the mountainous regions, the construction of air bases is an extremely difficult and expensive procedure, although some airfields have actually been built in the Alps. Quite frequently these Alpine fields offer not only bombproof protection for both aircraft and crews, but quarters for ground personnel hewn out of solid rock.

Alpine airfields, many of which are 9,000 feet above sea level, necessitate the inclusion of special courses in the aircrew

training syllabus and, to a lesser degree, the careful selection of equipment. Flying and fighting in the small valleys, and the general conditions encountered by Alpine fliers, are not, perhaps, ideal for the effective use of fast jet aircraft. Therefore, the selection of the *Vampire* as standard equipment with Swiss fighter and fighter-bomber squadrons came as a surprise to many, the characteristics of few jet fight-



The Swiss *D-3803* fighter plane.

ers being suited to operations from small, high-altitude bases. Nevertheless, the *Vampire*'s take-off and landing characteristics, maneuverability and general versatility, have successfully overcome all anticipated difficulties.

The role of the Swiss Air Force is a tactical one, co-operation with the Army being the primary duty. Thus, the flying equipment, with the exception of training and liaison types, falls into two categories, ground-attack and multipurpose. Before the war, the larger proportion of these airplanes were imported from abroad, but, during the initial stages of World War II, the Air Force had to rely entirely upon the output of the Swiss aircraft industry. Later, combat airplanes of German manufacture were imported to supplement national production, but this fact should not give the impression that Swiss sympathies were with our enemies.

Allegiance Was Divided

In World War I, broadly speaking, the German-speaking Swiss were pro-German, the French-speaking Swiss pro-allied. However, Swiss traditions were old enough to withstand the strain of the times and,

wherever their sympathies lay, they were first and foremost Swiss.

In World War II, the sympathies of the Swiss were not so clear-cut. They were almost all anti-Nazi, but there were some who were ready to enter into partnership with Hitler's New Europe. The Vichy Government's acceptance of French defeat complicated matters further, and when Switzerland was finally surrounded by the Germans, the one united concern of the Swiss people was to keep the independence which was so obviously in hazard.

If only because Switzerland was her neighbor, cut off by Axis territory from the rest of the world, Germany was able to make the Swiss sell her food and war materials and, in return, the Swiss were given German combat aircraft and spares. At the crossroads of the routes of night and day bombers of the allies operating from bases in Britain and Southern Italy against German-controlled industry and communications, both allied and Axis air-



The *Bu 131 Jungmann* biplane trainer.

craft accidentally flew over Swiss territory on frequent occasions.

Whenever Swiss neutrality was thus violated, the Swiss Air Force was used to repel the offending airplanes and several aircraft of both sides were shot down by Swiss fighters or antiaircraft guns.

Aircraft Manufacture in Switzerland

Switzerland became a Marshall Plan nation in order to help in the reconstruction of Europe, but she did not need to seek

American aid for herself, because, technically, Switzerland is better equipped than any other European nation. In common with other Swiss industries, standards in the aircraft industry have always been extremely high.

During the war, the industry consisted of four main plants, the Eidg. Flugzeugwerke (Federal Aircraft Factory) at Em-



The *Bu 133 Jungmeister* aerobatic trainer.

men; the Pilatus Flugzeugwerke A.G., at Stans; the Dornier-Werke A.G. (now renamed Flug- und Fahrzeugwerke A.G.) of Altenrhein; and the A. G. Adolph Saurer of Arbon.

The main wartime products of the Federal factory were the *C-3603* and *C-3604* two-seat attack and reconnaissance monoplanes of national design. Both the *C-3603* and *C-3604* were developed from the *C-3600* of 1938 vintage and differed from each other primarily in the type of engine and the weight of armament installed. Both of these aircraft still serve with the Swiss Air Force in small numbers.

Swiss interest in the *Vampire* originated in 1946, when four *Vampires* were purchased, three standard fighter aircraft and one modified to carry rockets and bombs. Experience gained with these aircraft led to the evolution of the *Vampire Mk.6* specifically to suit Swiss requirements, and 75 of these aircraft were imported from Britain during 1949-50.

It was then decided to manufacture *Vampire* airframes in Switzerland and the

Federal Aircraft Factory at Emmen has since started the production under license of 100 *Vampire Mk.6* fighter bombers. The components for the *Vampires* are manufactured by the Pilatus Flugzeugwerke A.G., at Stans, the Flug- und Fahrzeugwerke A.G., at Altenrhein, and two other concerns at Schlieren and Grenchen. The airframes are assembled at the Emmen plant. The *Goblin* turbojets are supplied direct from De Havilland. Next year the De Havilland *Venom* will replace the *Vampire* in production at Swiss plants.

The *Vampire Mk.6* is generally similar to the *F.B. Mk.5* of the Royal Air Force, but a 3,300-pound static thrust *Goblin* engine is installed.

The Pilatus Flugzeugwerke A.G. is the principal supplier of advanced training aircraft for the Swiss Air Force, and this concern's Pilatus *P-2* two-seat advanced trainer is widely used. The *P-2*, with the North American *Harvard*, is a standard advanced trainer and is of extremely simple and rugged construction.

A more recent product is the *P-4* five-



The Swiss Air Force's *D-3802* fighter.

seater powered by a 260-horsepower engine.

The Flug- und Fahrzeugwerke A.G. originated in the early twenties as a means of circumnavigating the restrictions on German aircraft manufacture imposed by the Treaty of Versailles. Founded by the Dornier-Werke G.m.b.H. of Friedrichshafen, the plant was erected near the Bodensee, east of Rorschach in the valley

of Altenrhein on the Swiss shore of Lake Constance.

Between the wars, the Altenrhein factory worked in close co-operation with the German Dornier works and produced various types of warplanes and commercial aircraft. Among the plant's more notable products will be remembered the three Dornier *Do X* 12-engine flying boats which were, in their day, the largest flying boats in the world. In 1937, quantity manufacture of the Bucker *Bu 131 Jungmann* and *Bu 133 Jungmeister* biplane trainers began. These were intended primarily for export but, when the war started, production deliveries were diverted to the Swiss Air Force which still uses both types.

From 1938 onward, the plant was devoted almost exclusively to construction work for the Swiss Air Force and a license was acquired to build the French *Morane 406C* single-seat fighter.

This type was redesignated the *D-3800*, and development of the design resulted in the *D-3801* which entered production in 1939. Simultaneously to the production of the *D-3801* fighter, the Altenrhein plant produced numbers of *C-3803* monoplanes under license from the Emmen factory.

By 1942, it became obvious that the *D-3801*, then standard with Swiss fighter squadrons, was considerably behind contemporary standards and had reached its ultimate in design development. The *Me 109* fighters delivered from Germany were unpopular with the pilots, and the design section of the Altenrhein factory was asked to produce a new fighter. Designated the

D-3802, the new machine progressed from mock-up stage to flight trials in 13 months.

The second prototype, modified up to production standards, was known as the *D-3802A*, and 10 machines of this type were on the line at Altenrhein with a further 90 on order when the service appearance of jet aircraft led to the cancellation of all orders for the *D-3802A*. However, jet aircraft were the order of the day, and a later development of the *D-3802A*, known as the *D-3803*, was shelved shortly after the prototype was flown.

The current activities of the plant include the manufacture of *Vampire* components, but reports indicate that the design office is still active on jet projects and we may expect to see jet fighters of national design again emerging from this concern.

Although all fighter and fighter-bomber squadrons will be equipped with the *Vampire* in the near future, another standard Swiss fighter is, at the present time, the *F-51D Mustang*, 50 of which were purchased from the United States War Surplus Board.

Through three wars between her great neighbors, France and Germany, Switzerland has remained anxiously neutral. However, of one thing we can be certain, if attacked, Switzerland will give a good account of herself and, should necessity force her joining the Atlantic Pact nations in the defense of Western Europe, her well-equipped and well-trained air arm will be a very valuable weapon for use against invaders.

Never in history has the importance of maintaining strong, well-trained, well-equipped, and well-balanced armed forces been so clear.

Secretary of the Navy Dan A. Kimball

Mackinder Today

Digested by the MILITARY REVIEW from an article by
Wing Commander H. D. Newman in the "Royal Air Force Quarterly" (Great Britain) January 1952.

Who rules East Europe commands the Heartland,
Who rules the Heartland commands the World Island,
Who rules the World Island commands the World.

No DELVING into the fundamentals behind the complex web of present-day international relations can be undertaken without the "heartland" theory intruding itself. It cries out for attention and refuses to be shelved unstudied. An assessment of the significance of this penetrating piece of strategic thought in the light of modern developments thus becomes an essential element in acquiring the background knowledge necessary for the correct interpretation of world events and trends.

The Theory Stated

In 1904, an eminent British geographer, Halford Mackinder, made one of the first attempts to show how historical development had been guided by facts of geography. History to Mackinder was geography in motion. He argued that the history of Europe was subordinate to that of Asia in that modern Europe is a product of reaction and resistance forged by the poundings of an Asiatic hammer—raids by nomadic tribes issuing from the inner steppes through the Urals-Caspian gap—against an anvil formed by the sea-borne raiding of the Vikings. This, and not the lateral infiltration of Roman and Greek culture, he gave as the main cohesive force. It reached its peak with the Mongol invasion of the thirteenth century, but in retrospect was stimulating rather than overwhelming. The base from which the raids set out was the central land mass of Euro-Asia, an area of some 21 million square miles—almost half of the land mass of the globe—wholly inaccessible from the sea, but, because of its steppe nature, offering little obstacle to internal movement by land. It comprises essentially Asiatic Russia, Sinkiang, Mongolia, and the noncoastal regions

of the Middle East. To this area, bounded mostly by polar ice, desert, mountains, and high plateaus, open only to the west, Mackinder gave the name "heartland," and went on to show how before the days of sea mobility the power controlling it had the strategic advantage, until the development of sea power and a growing sea-borne commerce operating from bases in the fringe so whittled away this advantage that Europe was enabled to contain Euro-Asia and remove the threat of land power to her existence. He then pointed to the slow return swing of the pendulum arising from Russian expansion to the east and the development of the transcontinental railway. These factors presaged to him an economic development within the heartland not only comparable with that of any other region, but safe from the competition of ocean commerce. They led him to ask:

"Is not the pivot region of world politics that vast area of Euro-Asia which is inaccessible to ships but in antiquity lay open to horse-riding nomads and is today about to be covered with railways?"

In addition, he suggested that if the balance of power ever favored this pivot state, and its vast continental resources were available for the building of a fleet, then an empire of the world would be in sight. This, he considered, could happen if Germany were to ally herself with Russia, but concluded that a danger of irresistible pressure on Europe and other countries fringing the heartland would exist whatever power was in control. As an alternative, he gave a Chinese hegemony under the guidance of Japan.

The Theory Re-Examined

In 1918, Mackinder re-examined his

ideas. He concluded that the basis remained sound, and in an attempt to play the statesman and influence the Peace Conference at Versailles, he coined the well-known "heartland" rune. The lines crystallize his theory, the essence of which is that world affairs are controlled by a group of powers that lie in two parts of the rim of the huge, sparsely inhabited Eurasian heartland beyond the reach of any sea power. Any of these land powers that achieved strong control of this heartland would be in a position to conquer all the fringe powers, one by one, and extend its rule to the World Island—Europe, Asia, and Africa—and so eventually to the entire world. A later reassessment in 1943 saw his conception remain basically intact. He did, however, split his original heartland into two: Heartland Russia to the west of the Yenisei River and a supporting area of large, natural reserves to the east which he called "Lenaland" after the Lena River running through its center. This combination, he thought, loomed with greater power than the original heartland and turned his earlier speculation into reality. The introduction of "Lenaland" scarcely alters the dicta of his 1918 rune, and an examination of each in turn gives perhaps the best means of making an up-to-date assessment of the value of the theory as a guide to the future. As a prelude, however, it is helpful to attempt to discern his purpose in propounding the theory, and then delineate the changes that have since taken place.

The Underlying Purpose

Mackinder was British. He belonged to an age when British sea power was the dominant factor in world strategy. But though he looked at the world from Britain and through British eyes, his knowledge and vision enabled him to grasp the little-realized fact that improvements in the mobility of land power were eating away the strategic advantages of the sea. He saw a growing danger and sought by

evaluating the threat of land power mobility to that of sea power to wean his fellow countrymen away from their traditional preoccupation with the sea to a new appreciation of land values. He saw all too clearly that modern motor transport, aided by road builders, can follow with relative ease the paths of primitive tribes.

Subsequent Changes

To turn to the modern scene against which the theory must be tested, the first change to demand attention is the eclipse of the Mercator projection as an instrument of strategical thought. The Mercator world shows a Siberian heartland fringed by Russia, Europe, Africa, India, and China to form the World Island, which, in turn, is flanked on the left by Great Britain and the Americas and on the right by Japan, Malasia, and Australasia. However, in the heartland region, the Mercator map distorts the picture as seen on a globe. The Americans do not flank the heartland. They are joined by the polar ice to the main mass of Asia. The Arctic Sea contracts and is but a slightly larger Mediterranean. In consequence, if the strategical concept of the heartland is accepted as including all regions which can be denied to sea power, then to Euro-Asia must surely be added the Arctic ice and part of North America, particularly as the air comes to the assistance of ground in opening up previously inaccessible areas.

Aviation, in adding a third and increasingly important medium of mobility, tends to change the picture. Though it augments the internal mobility of the heartland, it also destroys the barrier of the polar ocean and leaves Euro-Asia vulnerable from the north to air power flying over the Pole from bases in North America. Air mobility, however, cannot compete economically with mobility on land or sea except in those areas where natural obstacles forbid surface transport or raise its cost to that of the air. Surface activity in areas where it must be sustained by aerial lines of com-

munication will, for a long time to come, be only of a minor nature. This applies particularly to the Arctic, though explorers like Stefansson and geographers like Hanson regard the lack of a settled population along the Arctic shores on which to base a large army rather than the polar ice, and night as the main barrier to large-scale operations by ground forces in the area. However, for the present, it remains true that, though Mackinder's heartland is open to air attack from the north and indeed from most directions, the prospect of successful invasion which must depend on land and sea power is remote. The significant question is whether air power can inherit the role of sea power and offer nations on the fringe the possibility of still containing the heartland despite the advance of internal communications. The answer seems to lie in the relative degree of economic power.

Combination of Factors Required

In a modern large-scale war, the ultimate result depends largely on manpower, access to adequate supplies of food and raw material, industrial capacity, and the relative degree of technological development. Victory inclines to the combination holding the advantage in these vital factors. Land space is important, but its value lies chiefly in the fact that time can be bought with space. It is a strategic cloak, important more to the defender than to the aggressor. The past half century has seen arise in the Americas a combination of natural resources and industrial capacity which far outstrips the economic potential of any other region. That this advantage can be matched in the near future by a comparable development within the heartland, where severe climatic conditions require a higher expenditure of energy on the mere process of living, appears unlikely. Combine the resources of the Americas with the industrial complex of Western Europe and the prospects of the heartland are further dimmed.

In addition to the seemingly poor prospect of speedy industrial expansion, it is doubtful if the heartland could ever hold the manpower required to maintain a permanent empire. Lack of manpower was the root cause of the transient nature of the control set up by the early raiding tribes. Such permanency of control as existed came from that part of the margin in which are situated the more populous lands. However, the balance of manpower is shifting. The shift, at present, favors the vigorously growing nations within the USSR. It seems that biological inheritance is producing qualities in the heartland people which compensate for climatic handicaps. On the other hand, there is evidence that reproduction rates within the USSR are declining as the degree of urbanization increases. On balance, it is doubtful if the peak population of the region will reach an adequate figure.

This outline of the changes which have taken place can be suitably rounded off by looking back on two of the potential developments which Mackinder considered would constitute a danger to the marginal sea powers, but which have not materialized. Germany has neither allied herself with nor successfully dominated Russia. The reverse is perhaps partially true. The German defeat in the West in 1918 and on all fronts in 1945 has seemingly put such a combination farther away. The German General Haushofer thought it could best be brought about by economic infiltration. In this event he was disregarded. The German effort to control the heartland was based on military action. It failed. On the other hand, the Soviet Union, by slow but sure colonization and economic pressure, has brought it under her exclusive control. The defeat of Japan disposes for the foreseeable future of the other alternative of control by China under Japanese tutelage.

The effect of Communist China is hard to assess and depends on the ultimate relationship of Peiping to Moscow—subser-

vient, co-equal, or independent. It does, however, offer an alternative combination, particularly powerful in manpower.

Effect of the Changes

Mackinder's first dictum that the ruler of Eastern Europe is the commander of the heartland is today an axiom. The USSR has inherited the Mongol Empire. By an eastward colonization following the railway, the icebreaker, and the airplane, she has consolidated her power over inner Asia. She has matched this internal development by an increasing outward pressure as though in response to the second dictum. Her control over a ring of satellites on her western and southern frontiers grows stronger day by day, and her influence is felt increasingly in China, Korea, and Southeast Asia. Road and rail development in Turkestan, Uzbek, and the Pamirs area may indicate greater outward pressure to come. In Sinkiang, Chinese suzerainty is more a matter of name than of fact. The truth of the second dictum is open to doubt. If industrial capacity and the availability of trained manpower are now the major measure of ability to command, then a power based on the heartland alone has poor prospects of expanding its empire. But the USSR, once she has made her hold over her satellites complete and with the heartland in her possession, could from such a base set out with some confidence on a policy of world conquest. Ultimate success, however, would depend on obtaining control of the population and resources of Western Europe. Without this control, her resources would be insufficient to give her command of the other marginal regions and so rule the World Island. The possibility of the USSR, dominating the West European industrial complex by purely military means appears to diminish as the slow integration of this region proceeds. The idea of a European Federation, politically and economically stable, with a single European army does not seem to have lit Mackinder's thoughts. Be that as

it may, the combined resources of Europe and the heartland are necessary to the power that would dominate the World Island, with Europe as the main center. In other words, change has called for a concept of a heartland larger than Mackinder's original pivot state before rule of the World Island can be certain. At first sight, a Communist China allied with the Soviet Union presents an attractive alternative to Europe, but such a combination holds the advantage only in manpower, and by dividing it into two sections mutually hostile may well prevent the unification of the World Island, Mackinder's prerequisite for world conquest. The third and final dictum can be accepted. The area of the World Island equals two-thirds of all available land. Within this area are three-quarters of the world's population and the majority of races with the highest rate of increase. As a single political and economic entity centered on Europe, the richest natural region of the globe, it could stand unchallenged, and, if it wished, could bring the remainder of the world under its domination.

Conclusion

Mackinder's theory thus remains a powerful generalization of considerable import. Much of it is opposite to the present. The objection to accepting it wholly as a practical guide lies in the second dictum. The difficulty is to delimit, in the light of improving communications, the effective heartland. The arrival of total or global war tends also to lay the strategical emphasis on manpower and industrial capacity rather than on space. In consequence, Mackinder's heartland tends to diminish in importance its place as the pivot being taken by Europe. Changes in the sources of power for industry and in the age composition of population may in the course of time again change the picture, but these are hard to forecast. Meanwhile, the theory, if used critically, is of assistance in assessing the trend of political and military events.

Strategy Was Never a Purely Military Science

Translated and digested by the MILITARY REVIEW from an article by
Major Alfredo Pereira da Conceição in the "Revista Militar" (Portugal) February-March 1952.

THE word *strategy* was apparently employed for the first time by the Greeks, with the following etymological definition: "A combination of knowledges necessary to the commander in chief."

Based on this definition, nearly all of the military writers of the nineteenth century used it, studied its meaning, and considered its application to be of a strictly military nature, a fact which still remains true today, especially among the laymen, with serious detriment to its development.

However, neither the etymological definition, the historical mentions, nor the evolution of contemporary science could exactly fit strategy into the narrow limits of a science which is purely and exclusively military.

It may seem, at first glance, that this assumption is based upon an attitude of rebellion with regard to the military classics, or that it is expressed as a means of seeking journalistic sensationalism, so common today. I can assure you that such thoughts are not intended.

This article is the product of a great deal of thought and study. Its main purpose is to clarify certain concepts, from which have resulted old-fashioned attitudes.

Was strategy born on the battlefield? If so, is that why it has become a military science? Certainly not; history refutes this!

In fact, if we study Greek political history, we will find in its original constitution (eighth century B.C.) that the duties of an army commander were exercised by a *polemarchos* (war leader), as was also shown in all later constitutions.

First Mention of a Strategist

The mention of a strategist is made for the first time in the reform of Draco, promulgated in 621 B.C., in which we find that

the responsibilities of staging a war were more of a managerial than a command nature.

It must be borne in mind that, at that time, Athenian society was based on a military organization, which shows one of the marked characteristics of the evolution of human society. The strategists immediately showed such an amount of political influence that one of them—Pisistratus—became head of the popular party and attained complete power in the beginning of the sixth century B.C. From then on, the strategists were not only the *men who knew the art of war*, but also the ones who directed the political action, as was evidenced in the case of Pisistratus and, later, Cleon, who headed the party of the rich.

This characteristic was accentuated in the Constitution of the Four Hundred (fifth century B.C.), which, besides determining the number of existing strategists (listed as 10), gave them the right to govern the country while it was engaged in war.

Through this long evolution, the strategist assumed his real role. And, as a consequence, the science of strategy was born.

The Application of Strategy

Therefore, strategy appeared in the political organization of Greece as a social science applied to the state in case of war. From then on, such a concept was found expressed constantly and clearly in all fundamental laws of state.

In 275 B.C., the Aetolian League promulgated a constitution whose essential bases were:

Power is given to an Assembly in which all citizens may take part, and which convenes twice a year to vote on laws, later reviewed by a college of legislators. *This Assembly elects a strategist to whom is delegated the executive power.* He is assisted by a hippocrach, a chancellor, a games judge,

and seven financial magistrates, all elected by votes. *Working with this strategist is a group of assistants forming a state council and a supreme court.*

At the same time, another party was organized, the Achaean League, with the same political organization, giving the "executive power to two strategists," assisted by various other members.

The evolution of Greek politics led the peoples of the democracy to the oligarchy, and, as an inevitable consequence, the state became more and more powerful.

The Superstrategist

That is why, during the second century B.C., all powers of the central government were concentrated in the hands of a *superstrategist*, who was, at the same time, a minister of the interior, a minister of the dominions, a minister of public works, and a minister of war. In fact, the only thing outside of his jurisdiction was the administration of finances.

Therefore, we can conclude that this *superstrategist* was responsible for the general politics of his country, including domestic, foreign, economic, and military politics. In short, he was the "boss" who was responsible for the guidance and maneuver of the country's politics—a true commander in chief of all forces of state and nation.

The original definition of strategy which was given at the beginning of this article would thus be well chosen. However, the majority of the military writers have placed the commander in chief in a purely military field, limiting the strategic field.

Another Definition

Xenophon's (the Greek historian) definition of strategy was the one which best translated the true meaning of the term, that is: "The art of guaranteeing freedom to the people and to the state."

The fact is, however, that this idea was lost for more than 2,000 years; and it was only at the end of the eighteenth century that it reappeared, brought to the light of

science by Baron Dietrich Heinrich von Bulow in his book *Spirit of the System of Modern Warfare* (1799). For this military writer, strategy was still the "doctrine of the security and freedom of the state," although it was studied strictly from the military point of view.

This budding science began at that time to take its first step, sponsored by such notable writers as Jomini in his *Summary of the Art of War*, and the Archduke Charles with his *Principles of Strategy*, not to mention Clausewitz, Moltke, Rustow, and so many others.

The fact is, however, that all these writers, who so notably contributed to the embryonic phase of the new science, became confused by confining it exclusively to the military field, and thus not continuing the lessons of old Greece.

The forced circumstances of the evolution of war, with its characteristic panorama of the conflicts of the twentieth century, would, however, make strategy abandon the military concept to regain its real meaning, one of which it had already assumed at the time of ancient Greece.

A Parallel in History

Many facts may have led a great number of men of the last century to view strategy in its true light. Practiced as a science, it only lacked being codified in laws. This happens many times to different branches of science. The strange alchemy of the fifteenth century appeared under the name of chemistry three centuries later, and yet today it performs the disintegration and transformation of our latest discoveries. The definition of chemistry as a science is today taken for granted, but two centuries ago it would have caused laughter. We cannot deny, however, that it was already practiced then by the men who worked with steel and gold, or manufactured glass and porcelain.

In the same manner, we can prove that strategy, although not defined by laws, existed and was practiced as a law.

It is true we owe its appearance in the field of sciences to notable military personalities, who, unfortunately, for the sake of their profession, only saw it by the light of their activities. The wars of the twentieth century have given it its rightful place.

Influence of World War I

World War I destroyed the old concept of armed forces, replacing it by the concept of armed nations. This was the first war to show that strategy, as it had been understood until then, was much too limited.

However, in spite of this, at the end of hostilities, many writers and military students, born under the influence of the old ideas, were not able to muster the necessary courage to come up to the true concept of the new science.

The writing of Ludendorff, however, led to the concept of total war, which replaced the one of armed nations; and it was at this point that strategy finally moved to the road it should follow.

The realization that war had to be fought in all fields at last tore the veil which blinded the spirit of many and prevented them from understanding that the laws of strategy should be transplanted from their military origin to these various fields.

In reality, circumstances have compelled a generalization, but men, attached to the premise of the origin of strategy, still falsely insist in considering its application as one military imposition.

Influence of World War II

However, with the advent of World War II, men had occasion to verify that the supreme control of nations at war requires a deep and extensive knowledge of sociology, economics, and politics, which are inherent to the military action, and from which result the maneuver of the forces at war.

One begins then to conclude that *strategy is the systematic science of the security*

of the state and its people, just as it had been conceived in the very beginning.

Thus, World War II brought about, therefore, the generalization of strategy to the various branches of government, but in spite of this, which was great, it still restricts strategy to the periods of armed conflict.

If there were not yet the condition of space, there was already the one of time—which, in truth, was a false conception of strategy as a science. The last 6 years after the war were instrumental in destroying this mistake.

The Struggle for Existence

We have now rightly come to realize that the *life of societies is like the life of individuals: a hard and constant struggle for existence*. Furthermore, it is a permanent struggle—whether armed forces intervene or not. The cold war is proof of the permanent struggle in which the human race is living. The political and economical struggle of the nations in the international picture give us a true perspective of strategy as a permanent science in the control of people. *No more can strategy be considered an exclusively military concept, no more can it be considered a wartime concept.*

How should strategy be conceived today?

In reality, it is the science for the supreme control of states, in peace as in time of war. Therefore, it is a science of permanent application to the life of human societies, which is constituted of a variety of knowledges indispensable to the chief or chiefs of a state.

Laws of Strategy

Strategy has its own laws and principles, which, if not strictly observed, will carry with it serious consequences. For example, Portugal is a sea power—which is confirmed by her history and her present overseas empire. According to the laws of strategy, in order that she may continue as such, she must dominate the seas. She dom-

inated the seas in the fifteenth and sixteenth centuries, and lost her domination of the seas completely in the eighteenth century with the advent of steel ships. In view of this, Portugal can continue to fulfill her historical role as a sea power only if she allies herself with the country that dominates the seas today. To make an alliance with a land power would be an inexcusable strategical mistake, which would lead her to lose her overseas empire. *Thus, the only alliance which is convenient for her is with a power which dominates the seas, whether its name yesterday was England, today the United States, or tomorrow Japan.*

Fortunately, this is a law of strategy which all Portuguese governors have strictly observed—and which substantially explains the continuance of our overseas empire, while we witness the destruction or loss of the empires of other nations which have disregarded this law. We could mention as examples Spain and, more recently, Italy, which, contrary to their sea interests, have allied themselves with land powers.

All this was mentioned to prove that the ignorance or the disrespect for the laws of strategy will bring nations very serious consequences, even to the complete disappearance of such nations from the international community as a state in fact and by rights.

A Combined Effort Required

Therefore, strategy is a science whose complete knowledge is indispensable to the heads of states, but whose implementation must be provided by the various agencies of the state and the people.

In this respect, it is interesting to point out that Dom Henrique (The Navigator) was able to be the master of the strategy of discoveries in the first half of the fifteenth century.

Fighting against all difficulties, overcoming all sorts of obstacles, he followed a fixed line of conduct, and always showed

an excellent comprehension of strategy. He was able to pull his people with him, making them co-operate in an enterprise which began as an individual effort and ended up as a collective undertaking.

Now that we have discussed the scope of strategy as a science in the government of a state, it is time to consider it in the field of science itself. It should be placed among the *social sciences*, where it will meet other sister sciences, whose study is valuable for the carrying out of its particular function.

Forces of Strategy

If we analyze the means at the disposal of a commander in chief of a state, we find, immediately, the existence of the following forces which must be maneuvered and commanded by him:

1. Political forces (internal and external).
2. Economic forces.
3. Military forces.

The play of these forces is the particular objective of strategy. However, if we observe carefully, we find that each one of the foregoing forces demands an individual maneuver, with different technical characteristics, and, consequently, with requirements of specialization indispensable to the implementation of the common objective highly imposed by strategy.

Thus, each branch is based on its particular science, which is different in each case.

The *political forces* have their maneuver based on politics and diplomacy. The *economic forces* have their maneuver based on political economy and finances. The *military forces* have their maneuver based on the science of war, with its four ramifications: military organization, military strategy, tactics, and logistics.

The existence of these basic sciences does not imply that the various ramifications do not have as auxiliary sciences

many others such as history, geography, statistics, and psychology.

However, its basic sciences serve to differentiate the individual play of each one. In such a way, it is not surprising that from each we should demand a particular strategy, always in obedience to the strategy of the whole.

It is now easy to conceive a *political strategy*, applied to the maneuver of political forces of the state (either internal or external); an *economic strategy*, applied to the maneuver of the economic forces of the state; a *military strategy*, applied to the maneuver of the military forces of the state; and, in conclusion, an *over-all strategy*, designated to orient and co-ordinate the action of the first three. *The over-all strategy is, in reality, the science of the commander in chief of the state.*

The actions and reactions of the three branches not only can reflect on each other, but also on the over-all strategy.

To illustrate this, we could mention the loss of the Iranian oil fields by England in 1951. An unfortunate *political strategical maneuver* (internal and external) on the part of England led Iran to repossess the oil fields. This brought about, as a consequence, the loss of this source of production, which meant a setback of the British *economic strategy*.

However, as the British forces in the Orient, the Australian and Indian forces, and their allies counted on these facilities as the source of supply for their fleets, their planes, and their tanks, the economic strategy setback represented the immobilization of vast armies of land, air, and sea forces in the Far East.

Such a fact obliged the implicit and automatic revision of the military defense of those areas. The immediate revision of those points, imposed by the *over-all strategy*, brought with it great *political consequences*, originating reactions in the internal politics which have heavily contributed to the replacement of the Labor

Party by the Conservative Party. The revision of the *over-all strategy* in England was immediately put in evidence by the first governmental measure taken by the new party as soon as it came into power.

Conclusion

Neither history nor the demonstration of facts permit us to say that strategy is a purely military science.

The classics made a mistake when they confined it to a narrow limit of space and time—a theory which events have disproved. It has now gained its rightful place.

In some countries, its importance has assumed such heights that it constitutes a science studied in various civilian universities and colleges. *Strategy was never a purely military science—it is truly the science of statesmen.*

A complete and deep knowledge of this science requires an extensive and long preparation; such a knowledge is only found in those men who possess political experience, practice in economics, and military know-how. In World War II, there were two men who stood out for these qualities: *Churchill* and *Hitler*. In their conduct, they certainly observed the precepts of *over-all strategy*.

The price of forgetfulness of the laws of strategy and the ignorance of its principles spells annihilation of a people.

In the field of specialization, the only ones who study the ramifications which affect them are the military, since they consider military strategy as a science of their own.

The schools of law, philosophy, and economic sciences of our universities should include in their curriculum courses on *political* and *economic strategy*, in order to prepare the intellectual elite for these fields, and not let them obtain their knowledge only through years of practical experience—from which only a few specialists can be obtained and which means a grave danger to the future of a nation.

The Philosophy of Limited War

Digested by the MILITARY REVIEW from an article in
"The Aeroplane" (Great Britain) 11 January 1952.

ONE of the greatest dangers resulting from wars is that their military lessons might be regarded too closely as a pattern for those which may follow. In World War II, the decisiveness of the strategic bomber has led to its predominance in the air armory of the United States. The keystone of American power politics is the combination of the long-range bomber and the atom bomb, capable of global coverage through its mobility and the tenure of strategically situated bases throughout the world.

Nobody can deny that the United States Strategic Air Command, as a projection of the most industrialized nation on earth, is the most powerful weapon in the air. It is also the most expensive. While its proponents may proclaim its invulnerability to conventional countermeasures, it is at once made terrifyingly impotent by the revived political concept of limited war.

Total wars of the present century have shown with brutal clarity the pyrrhic victory gained by the destructive power and range of modern weapons. By virtue of its geographical location, the United States has emerged so far from world conflicts with its industrial civilization not only unscathed, but, as a result, even more strongly developed. Its participation in the present world-wide reconstruction, however, should convince the most isolationist of Americans that, in the future, the internal economy of a victor must be rebuilt simultaneously with that of the vanquished.

Any hope that the United States may have had that the Strategic Air Command could deliver a decisive blow at the beginning of a total war while its bases and industrial potential remained inviolable was dispelled with the explosion of the first Soviet atom bomb, and the appear-

ance of Soviet-built *Superfortresses*. However, whereas the very strong threat of Strategic Air Command, plus a stock pile of atom bombs, may serve to deter the Soviet Union from precipitating a total war, there is ample evidence that Soviet imperialism favors the continuation of limited wars to further its objects without exposing its homeland or economy to any danger.

This is on the legitimate assumption that the present might of Soviet arms is directed primarily to the short-term aim of internal Soviet security, which arises from the traditional fear of invasion—so often the fate of this state with its vast land frontiers. An additional, and perhaps vital, safeguard is the belt of satellite buffer states which the Soviet Union has succeeded in establishing since the end of World War II. From the longer-term aim of world domination, the Soviet armed forces are the backing behind the psychological and ideological offensive, and the challenge to the West which has resulted in competitive rearmament with its advantages, from the Soviet point of view, of the enforced lowering of living standards and the weakening of moral and economic recovery.

What Is a Limited War?

The conflict today between the two world masses is fundamentally ideological, and its course, therefore, is likely to be governed more by psychological factors, unfettered by past military traditions. No clearer insight into Soviet strategy could be gained than by Lenin's maxim that the soundest course in war is to postpone operations until the moral disintegration of the enemy makes the delivery of the mortal blow both possible and easy.

By avoiding a total conflagration, the

Soviet Union is making use of the normal economic competition existing in declared conditions of peace between democratic states to prevent the integration of economic strength. With the establishment of the North Atlantic Treaty Organization, the Western powers have eliminated many of their long-standing military prejudices, but from the political point of view, without the compulsion of total war, the various statesmen show a remarkably divergent policy. Therefore, a limited war, although a threat to all, restricts the establishment of a common aim, which is a *sine qua non* in any military alliance.

In the case of Korea, this limited war is marked not only by differing policies between the participating countries, toward, for example, Communist China, but by most serious and public differences of opinion between United States politicians and military commanders in the field. These psychological factors in the war may well serve to balance the disparity in arms and equipment and, as already mentioned, have eliminated at the present time the all-powerful strategic air weapon. In the breathing space thus gained, steps are being taken to reduce the margin of allied tactical air supremacy.

Reverting to Lenin, the Soviet Union is postponing total war by the conduct of a number of limited wars in which she takes care to avoid direct participation. They are by no means new to the Russian people—the Russo-Japanese War of 1904 was launched against them with the specific object of their withdrawal from certain areas in East Asia, and to that end Japan was successful. A more recent example of a successful limited war was between Israel and the Arab League, in which a definite area of territory was acquired by force of arms by the Jews.

One of the greatest virtues of limited wars, as history has shown, and Air Marshal Saundby has pointed out, is that, almost invariably, they are successful in

gaining some specific end, in contrast with total wars. Air Marshal Saundby goes further and suggests that in total war there should be a limited object. The attacks on Russia, for example, by Napoleon and Hitler, with the object of the complete subjugation of her peoples and economy, failed, whereas the limited aims of Japan, in 1904, were successfully concluded.

This brings up the question of the demand for unconditional surrender by the allies in World War II, which has been increasingly criticized by military strategists over the past few years. By its lack of limitation, this error of psychology lengthened the war by delaying the collapse of the Italian regime, and hardening German resistance, while General Fuller has attributed to it the establishment of Soviet autocracy over nearly all of Eastern Europe. In his opinion, during the past 5 years, the most remarkable development in the psychological pattern of future wars is to be seen, with the Soviet ideological empire covering nearly a third of the land surface of the globe and including 40 percent of its inhabitants. This remarkable conquest has been gained without the shedding of a drop of Soviet blood, and is continuing against the massed and increasing arms of half the world's nations.

Total War on the Leash

Thus, it has become possible to envisage an entire series of hostile, Soviet-inspired acts, sufficiently rewarding to be attempted, but not sufficiently serious to warrant the unleashing of the tremendous force of atomic destruction. In the present so-called "cold" stage of the ideological war, there have been several more or less warlike situations, some of which would at one time have led to total war, but for, from the Soviet point of view, the advantageous United Nations organization, with its system of blocs and vetos.

Almost imperceptibly, the scale of these stages in limited wars, on the whole successful in their objects, has been constantly increased, culminating in the Korean conflict, and the less spectacular but possibly more important battle for French Indochina. They are, in fact, developing into the new concept of global war, which will become total, however, only by accident, or if resort to military force would offer the quick realization of world domination, which is improbable.

The present series of insurrections and conflicts in the Far East are limited in their nature, but not in their effect. As the fortune of battle ebbs and flows between the Communist and United Nations forces in Korea, so the morale of the bandit forces in Malaya and Indochina rises and falls with it. In fact, Korea, Indochina, and Malaya are different facets of the same war, limited by the Soviet-inspired, Chinese-executed aims of Communist domination.

For many reasons, the Far East offers the most suitable setting for limited wars. The high proportion of Chinese in Southeast Asia offers a ready-made fifth column, which is an essential part of Soviet strategy, while, topographically, the universally mountainous jungle is the most difficult country for the employment of tactical air. Warfare reverts almost to the premechanized era, and the most effective weapon in the air armory has become the transport airplane or helicopter. As of old, the man has emerged more important than the machine.

It is essential to make an ally of the strong nationalist feelings which have arisen in the Far East since the war, as was done, for example, by far-sighted statesmanship in India, Burma, and elsewhere. Only by such political measures can the military disadvantages of the permanent loss of initiative to the Communists be offset. The initial danger arises from a lack of internal security,

and most of the present-day limited conflicts appear to have their foundation in civil war. It is, therefore, necessary, both militarily and politically, to ensure that the Asians feel the responsibility for the organization of their collective security, although counteroffensive action has naturally so far depended on the Western powers. A better policy for the future is obviously to arm the nationals in Southeast Asia to secure first their own internal security, while attacking communism in those countries at its ideological and economic roots. The task is by no means small.

The threat of limited wars is additionally unwelcome to the Western powers because of the necessity of maintaining literally a world-wide distribution of forces, diluting their over-all strength in direct contradiction to the conventional principles of war.

From the short-term viewpoint, possibly the most important strategic area is the Middle East, which has been called a "power vacuum" since Communist influence is restricted by its unacceptability to Islam, and nationalism has led to a decline in Western influence. In contrast with the Far East, however, the forces of communism and nationalism are far less likely to be in opposition, and the blind nationalist fervor may be put to good use by the unseen power of corrupt Marxism. A good example is the Tudeh Party, in Iran, which is financed and controlled from Moscow, and from 1949 onward, bribed prominent Iranian nationalists for its own ends. This was admitted by M. L. Vasiliev, a former Soviet official in Teheran, and the results are by now history.

Iran provided an ideal setting for a limited war, if the strong-arm policy advocated by some in the United Kingdom had been executed, and now it seems that we are confronted with a similar possibility in Egypt, although to what extent

this is due to Communist influence cannot be ascertained. From the military point of view, however, limited wars in the Middle East are likely to be less productive to the Soviets than in the Far East, since the desert was the birthplace of tactical aviation as we know it today.

The Power of Air Transport

In Europe, the picture is again different. The racial barriers are rather more clearly defined, and the Communist elements outside the Iron Curtain, although strong, have their styles cramped by American economic aid. Nevertheless, divided Germany is a breeding ground for a limited war, since the East Germans provide the opposing civil component which effectively prevents the formation of a unified nation with adequate internal security. As a feeler in Soviet European strategy, the blockade of Berlin was most significant, and the resultant airlift proved once more the effectiveness of the air transport "weapon" in the "cold" stage of the ideological war.

Curiously enough, another key point in Europe is Communist Yugoslavia, which has cut itself off from the Cominform and is now the subject of Soviet hostility. With the stability gained from Western assistance, Yugoslavia would be a difficult breeding ground for a limited war, but her frontiers are threatened by hostile forces, and the traditional enmity of the Serbs, Croats, and Slovenes might threaten her internal security to an extent that a worth-while drive could be made by Communists "on the other side" through Yugoslavia and Greece to the Mediterranean.

Limited wars, therefore, will continue to serve the Soviet Union's short-term aims in the Old World, and it seems fairly obvious that a return to three-dimensional strategy may only be made when the most difficult stage of all is reached—the conquest of the New World. How well the

stage is being set is apparent from Communist activity in the United States, while the confusion of psychological, military, and political factors is shown in the paradoxical situation where a gigantic Western arms expansion is taking place simultaneously with prolonged international discussions on disarmament.

Are the Soviet proposals for control of atomic power and disarmament genuine, or are they part of the general psychological campaign against the West? Past experience does not give rise to confidence in Soviet integrity, but at least the doorway to peace is not firmly closed. In the meantime, there is an increased call for the Western powers to back their military activities with more powerful propaganda, and it has been suggested that there should be a return of the wartime Political Warfare Executive.

Perhaps the most dangerous Western reaction to the general feeling of impotence against continued Communist expansion in the form of limited wars is that section of opinion in the United States which increasingly is advocating the launching of the idiosyncratic "preventative war"—as if starting one war was any better than stopping another.

Aircraft Requirements

Korea has shown that the primary requirements in the air for limited wars are tactical aviation and transport aircraft. This does not mean that the strategic air component must be completely neglected. In the first place, there are always a few targets which justify the action of heavy aircraft, which may be required to operate over long ranges because of the unavailability or unsuitability of forward air bases. However, aircraft of a strategic force can be used for such targets, which may be of only a semistrategic nature, only if flexibility of operation is made possible by training and basic strategic concepts.

Second, the possibility of a total war can never be overlooked, although a force such as the Strategic Air Command remains its strongest deterrent. It seems, however, that the demands of world affairs must increasingly divert some of the vast sums which were earmarked for the United States strategic component to expand the strength of tactical aviation. Either through realism or its postwar financial pangs, the Royal Air Force appears to be better placed in that respect, since its strategic component is small and under-equipped, while its fighter equipment comprises reasonable numbers of jet airplanes which are more suitable for ground attack than the interceptor role.

However, even in a limited war, interceptors are far from indispensable. Hitherto in the Far East, United Nations troops have enjoyed virtually absolute air supremacy, which has enabled aircraft of all types to operate on close-support duties without fear of opposition in the air. In Korea, a small force of *F-86* interceptors has been able to contain enemy jet fighters well away from the battle front, but, in addition to the Soviet Union, the *MiG-15* is now in service with the Chinese, Polish, and Czechoslovak Air Forces, and sooner or later it will begin to seek its most productive targets around the bomb line. The United States Air Force doctrine that close-support aircraft should be able to hold their own against effective air opposition has yet to be proved, and in many ways the requirements of ground-attack and interceptor aircraft are incompatible.

Pistons versus Jets

This brings us to piston *versus* jet for close-support aircraft. Although the jet aircraft has shown good results in Korea, and, what is more important, is popular with its pilots, perhaps the most effective close-support weapon has proved to be the piston-engine Douglas *AD Skyraider*, which carries a phenomenal load, equiv-

alent to the *B-17 Flying Fortress* of World War II. The *Skyraider* is operated by the United States Navy under that service's conception of close support, which envisages air cover for strike aircraft, leaving them to concentrate on their specific job.

Jet aircraft operating on low-altitude strike missions must inevitably carry up to no less than 1,000 gallons of fuel, for a useful endurance, which restricts the offensive load to insignificant proportions. The solution to a good ground-attack airplane may lie in utilizing the advantages of the turbine and retaining a useful margin of speed, while gaining in endurance, by the installation of an airscrew-turbine unit, which should also help to minimize airfield requirements.

Efficient fighter aircraft also are required for the interdiction stage of the limited air war, which varies in its effectiveness according to the movements of enemy troops. Where the front settles down, as it has in Korea, interdiction attacks against enemy communications offer steadily diminishing returns. The mainstay of the interdiction offensive has been the piston-engine *B-26*, which is enabled to live in enemy-threatened air by its enforced use on night operations by the restriction of enemy movements to the hours of darkness. However, it is admittedly obsolescent, and replacement has already been found by the Americans in the form of the Martin-built English Electric *Canberra*.

In the interdiction role over longer ranges, the radar-fitted jet with a heavy offensive armament is essential for night operations in a limited war, and with its "trans-Atlantic" tankage, the *Canberra* has an adequate endurance for low-level operations while carrying a heavy military load. Its low wing-loading gives it the necessary maneuverability, and also eases the airfield problem.

Finally, we come to transport aircraft,

the importance of which has already been stressed; specialized strategic and tactical types are both needed. Limited wars impose particular requirements for air supply, since, if excessive distribution of force is to be avoided, air transport is the only method with the speed necessary for the reinforcement of threatened areas. Korea has provided another example where the long-range, high-capacity transport aircraft has come to the fore for flying in men and material, and returning casualties and other personnel. Distances involved in limited wars from the sources of supply may never diminish below about 5,000 miles, and, from the long-term point of view, the development of a military jet transport is essential.

Tactical transport in the air also requires specialized aircraft, and of the greatest significance in Korea has been the rapid operational development of the helicopter. Small- and medium-size transport aircraft are needed in large numbers,

with an outstanding take-off and landing performance and a low cruising speed, since the operating stages are short—and the helicopter obviously fits this specification. However, large-capacity, fixed-wing aircraft, such as the Fairchild *Packet*, designed for hauling and parachuting immense loads of varying bulk and capable of operating over medium stage-lengths, have shown their worth in Korea, which may be regarded as typical in the Far East in having only one usable seaport (Pusan), imposing a heavy responsibility on the airlift from Japan.

In the Military Air Transport Service, (MATS), the United States has a large and efficient transport organization, with all types of specialized aircraft—nearly 400 in all. If the readiness of the Royal Air Force to meet the commitments of limited wars is to be measured by the resources of the Transport Command, the conclusion is not encouraging, except perhaps to the Soviets.

The Language Problem in Western Defense

Digested by the MILITARY REVIEW from an article by
Captain K. Scott Simpson in "The Army Quarterly" (Great Britain) January 1952.

THE problem of language has been with man since the Tower of Babel. Considering the progress that has been made in every other field of human effort, it seems astonishing that the difficulty of international communication was not overcome centuries ago. Almost daily, the necessity for a common international language grows, and, as scientific progress and economic necessity bring the nations into closer contact, the solution grows more and more urgent.

With the advent of a proposed European army, whatever form it may take, direct communication between individuals of the various nationalities participating will be vitally important to its success. Interpreters will have to be considered as

a relic of a bygone age. Translators will always be required, but it is now of the utmost importance that all services in all countries concerned in Western defense should be able to communicate with one another, quickly and accurately. The advantages of direct communication at conferences, order groups, over the radio, and in the ordinary routine of daily speech are such that the value of an international language needs no further elaboration.

Requirements

If the need is accepted, the next point to be considered is what sort of language should it be. Certain requirements are imperative for any international language and they are:

1. It must be practicable.
2. It should be neutral; the selection of any national language will only offend national susceptibilities, and the classical languages, Latin and Greek, are too difficult and inadequate for modern needs.
3. The grammar must be simple.
4. The spelling must be phonetic.

Various European languages may lay claim to be used as an international language—but none satisfy these conditions. English is probably the widest spoken of the modern European languages. Its value in commerce is recognized. It also is spoken over most of the North American Continent and in Australia. By far the greater number of people in the Commonwealth, however, do not speak English. It is a difficult language for a foreigner to learn, its grammar is complicated, and its spelling defies all reasoning. The only other language which might lay claim to be used for international purposes is French, with its long tradition as the language of diplomacy. Nevertheless, it can by no means be called simple. How many of us remember the long lists of irregular verbs to be studied at school? How many of us remember much about it after leaving school? And what of the German, the Italian, the Norwegian—do they find French or English any easier to learn? Strong as the claim may be, it is based primarily on tradition and is not satisfactory for everyday use by all those, soldiers and civilians, concerned with the defense of the world against unwarranted aggression.

A Neutral Language Needed

Apart from the purely technical difficulties of learning a modern European language, each nation naturally considers its own language as the best suited for international use. It is ridiculous even to attempt to convince all Frenchmen that they must learn English, or all Turks that they must learn French. The deep-rooted national pride inherent in all of us

would doom such a scheme before it was launched.

For these reasons, it is obvious that to succeed at all, the chosen language must be "neutral." Such a language is Esperanto. First published in 1887, its inventor, Lazarus Zamenhof, had spent 17 years bringing the language to something approaching perfection before finally publishing it. He was an idealist, who saw in a common language the great possibility of at least lessening the prejudice and intense nationalism of mankind. He lived in advance of the present "international era," for Esperanto has stood the test of 60 years' use, during which time it has had several challengers, none of them satisfying the essential characteristics required in an international language.

A Successful Language

Let us consider this "constructed" language in some detail. There are at the present moment more than a million Esperantists in 100 different countries in the world. This, it should be noted, is on a purely voluntary basis. In the past, where government recognition has been given on rare occasions, tremendous success has followed, but probably very wisely, governments are slow to accept new schemes of this nature, more so as this particular scheme requires the co-operation of a number of governments. Its practicability has been amply demonstrated at the annual congresses held by the Universal Esperanto Association, where dozens of peoples of different nationalities have been able to converse freely and without difficulty, despite complete ignorance of each other's national language. A number of films have been made with the speech in Esperanto; a growing number of books and poems have been translated and original works published. Regular radio programs are broadcast from radio stations in Europe, Asia, America, and Australasia; this in spite of its progress being interrupted by two

world wars and intense nationalist policies.

The fact that it is a "constructed" language, and, therefore, neutral, is the greatest argument in its favor, since it cannot offend national susceptibilities. It does not replace any language, it is additional to the national tongue, and, as such, requires governmental action to make it really successful in attaining its object. In many countries children grow up bilingual. Why not in all? A lead by two or three of the great powers would give the inspiration and guidance that is needed for its fulfillment.

In spite of the fact that the value of an international auxiliary language is almost universally recognized, a common reaction when this subject is under discussion is "What is the use of learning a language that only a very few people speak?" A very pertinent and practical question, but entirely illogical. It might, with equally brilliant perception, be asked "Why did St. Paul retire from the army to teach the new gospel when only a very, very few people believed in it?" The answer of course lies in each and every one of us. It is the same answer to both questions. If we believe in it and are prepared to do something about it, it must succeed. Then let action be taken, and without delay.

Insofar as it affects Western defense it is clear that it would be of the greatest value in disseminating common military doctrine in military schools and technical establishments. Instead of dozens of different teaching establishments—with equally varying doctrinal theories—one establishment, possibly with a number of subordinate branches, could be created, teaching a common doctrine in a common language with common textbooks. The potentialities of such a system are almost immeasurable.

It Has Simplicity

In simplicity, Esperanto is without question far in advance of any so-called

"natural" language. The alphabet is phonetic, accent is standard and easily pronounceable by any nationality, and it is very easily learned by the colored races, an attribute of some importance when the training of colonial troops is under consideration. There are only 16 fundamental rules, with no irregularities and no exceptions. Ambiguity, the curse of all "natural" languages, is eliminated. It is based on root words derived from the Indo-European languages, and parts of speech are formed by affixes and suffixes. Could anything be simpler? The stumbling block of so many aspiring linguists, grammar, is reduced to a minimum, and it can, therefore, easily be taught to those who unfortunately have not had the opportunity of a "good" education. This is eminently desirable when considering the use of an auxiliary language in the armed forces. It is certainly true to say that all national languages are far too difficult for the average soldier to learn in a reasonable period of time, and still carry out his normal military duties. It is also true to say that the British soldier has a remarkable capacity for picking up bits of the language of the country in which he is stationed. Enough to be understood—or misunderstood—but this is not enough. Esperanto is easy to learn; it does require a certain amount of effort, but it can be learned by anyone with ordinary elementary education in one-fifth of the time needed for a national language by ordinary methods. By the direct method, akin to the Berlitz system, an intensive course of 1 month will give an exceedingly good grounding and enable any student to read, write, and speak it, particularly the latter. By the same token, it can be learned by the busy staff officer or senior commander with but little time to spare for the study of languages.

Many Considerations Involved

Although many senior commanders and staff officers of some of the European

armies speak English, it must be admitted that their knowledge is often very imperfect, and insufficient for the requirements of modern integrated staffs and formations in the field. In any case, the "wastage" rate of such officers is high in war, and they are not easily replaceable, if language qualifications are to be added to all the other requirements. Esperanto would solve this problem at all levels, and, therefore, it is necessary to take action now in order to smooth the way for all those whose duties bring them into contact with other nationalities. Esperanto is not on the list of languages in which regular officers may qualify as interpreters, neither is it on the list of colloquial language qualifications open to all ranks. While it is admitted that

the full adoption of Esperanto as an auxiliary language in the armed forces of the North Atlantic Treaty Organization requires the co-operation of all the nations concerned, it is no argument to say that it cannot be done. Co-operation works a hundred percent better when all co-operators have a common medium of communication throughout the entire world, not just one corner of it. Thus, if the Western nations take the lead in this, as they have done in most of the civilizing world processes, it is possible that out of the present fears of a third world war will emerge the everyday use of a common language for international communication which may contribute something, however small, toward international understanding.

Today, more powerful than ever in our history, our over-all strength must not be reduced by any lack of confidence in ourselves. Weapons and trained men, no matter how effective, must be supported by the public if a nation is to succeed. Therefore, let us address our abilities to the common cause of strengthening our great Nation by power of arms and community of spirit.

Secretary of the Army Frank Pace, Jr.

Once the soldier is trained to his weapon, he becomes a part of a highly developed combat team of infantry, artillery, armor, and air. These battle teams are the most difficult, the most complicated of all teams to create. They must be capable of operating on unfamiliar ground, in darkness as well as in daylight, amid incredible confusion, danger, hardship, and discouragement. The leadership of such teams is of the utmost importance; it requires judgment, intelligence, courage, integrity, and resourcefulness.

General J. Lawton Collins

BOOKS OF INTEREST TO THE MILITARY READER

REALITIES OF WORLD POWER. By John E. Kieffer. 336 Pages. David McKay Company, Inc., New York. \$4.00.

By LT COL JOHN F. TWOMBLY III, *Arty*

This appraisal of present international political conditions is based on two thesis; that war with the Soviet Union is inevitable and that the brand of totalitarianism wrought by the Nazis and the Russian Communists is a historically new pattern of world conquest. This, states the author, is Geopolitics, a new concept of the relations between states, denying the existence of international law or ethics among nations and governing all actions solely on the self-determined needs and desires of the state.

To present his arguments, Dr. Kieffer devotes the first 10 chapters to an analysis of the underlying factors of Geopolitics. In an easy to understand, journalistic style, he reviews the economic, geographic, and political background of the present world crisis. Herein the reader will find no profound new thoughts, but rather a well-organized summation of generally accepted truths.

The remainder of the book develops the strategic importance of the principal countries and regions of the world. A strong case is made for Western rapprochement with Spain; for a treaty, since realized, with Greece and Turkey; and for a more critical examination of our policy in Southeast Asia and the Middle East.

Although there can be little disagreement with the facts and factors presented

in this book, author Kieffer's two basic thesis are scarcely proved. One fails to discover at any point a presentation of outstanding differences between modern aggression and that of Alexander or Genghis Khan. As for inevitable war, there is only evidence from which many other intelligent men have drawn a less fatalistic conclusion.

THE IMPERIAL JAPANESE ARMY: Tojo's Military Socialism. By Richard L-G Deverall. 55 Pages. Deccan Herald Press, Bangalore, India. \$50. Distributed in the United States by the author at 40 Prospect Park West, Brooklyn 15, New York.

By CAPT WILLIAM H. BEAUCHAMP, *CE*

This booklet provides an excellent study of the penetration of Marx-Leninist ideas into the officer corps of the Japanese Army during the period from 1920 to 1945. The author believes a study of this army with its leftist leanings might help provide a background for understanding the totalitarian army of Mao Tse-tung.

The reader may not be convinced of any great parallel between the Imperial Japanese Army of Hideki Tojo and the People's Liberation Army of Mao because of the divergence in their national situations, including their positions *vis-a-vis* the Soviet Union. However, the reader undoubtedly will learn a great deal more about the political inclinations and activities of the followers of General Tojo than he knew before.

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MAIN FLEET TO SINGAPORE. By Captain Russell Grenfell, R.N. 238 Pages. The Macmillan Company, New York. \$3.75.

By IVAN J. BIRRER, Ph.D.

This is a British account of, and explanation for, the fall of Singapore. It takes its title from the long established, but never executed, plan of sending the main fleet to Singapore in the event of war with Japan. There is a play-by-play account of the sinking of the *Prince of Wales* and the *Repulse*. On the other side of the ledger is a vivid report of the Coral Sea battle and the Battle of Midway.

The reader will be challenged by the author's argument that both Churchill and Roosevelt were partly to blame for the Singapore disaster. He may be astonished when he reads: "No reasonably informed person can now believe that Japan made a villainous, unexpected attack on the United States . . . Japan was meant by the American President to attack the United States."

RED BANNERS OVER ASIA. By O. O. Trullinger. 212 Pages. The Beacon Press, Boston, Mass. \$3.00.

By WOJG ROSS L. SPENCER

On 3 January 1952, Andrei Vishinsky, in a speech before the Political Committee of the United Nations in Paris, accused the United States of transporting 70,000 Chinese Nationalist troops from Formosa to Thailand and Burma in preparation for an attack on South China, and said that the United States would describe this movement as defensive when "military operations begin against southern China." A forecast of coming military operations of this nature certainly causes us to direct our attention to Southeast Asia with a view to studying Communist penetration there. In his book, Mr. Trullinger gives us an excellent report of the co-ordinated Red infiltration of that strategic area.

He surveys the current Communist strength and organization in every nation

from Korea and Japan on around the Malay Peninsula to India and Pakistan. Each nation is accorded a separate treatment and the integration of the various national efforts by the Kremlin and Peiping discussed.

Startling, but constructive, *Red Banners Over Asia* aims at awakening the reader to the involvement and necessity for responsible action.

HANDBOOK OF COURT-MARTIAL LAW. By Conrad D. Philos. 575 Pages. Callaghan & Company, Chicago, Ill. \$4.50.

By LT ALAN F. ASHER, JAGC

This Handbook was intended to complement the *Manual for Courts-Martial, 1951*, by developing points that the Manual could treat only in a general manner because of space limitations, and by setting forth actual cases which illustrate and clarify the various provisions of the Manual.

One of the principal values of the volume will be to assist new court members by showing the results reached in other cases under the various provisions of court-martial law.

Keyed by paragraph to the *Manual for Courts-Martial, 1951*, the volume is a valuable digest which can be used quickly and easily to find authoritative decisions reached under the same basic law. Exemplary are the 49 cases cited to show court determinations of intent in desertion cases by inference from period of absence and other factors.

The author, while a major in the Infantry Reserve, served as Chief of Military Justice, US Forces in Austria, under Colonel C. Robert Bard, JAGC, who has written the Foreword of the Handbook. Colonel Bard, now on duty in the Army Judge Advocate General's Office in The Pentagon, refers to the author's promise to compile a book that would be valuable in every aspect of trial by court-martial.

OUR MEN IN KOREA. By Eric Linklater. 79 Pages. Her Majesty's Stationery Office, London, England. 3 shillings, 6 pence.

BY COL JACK S. SANDERSON, *British Army*

This little booklet, by the well-known British author and historian Eric Linklater, is, at the moment, the only official account that has been published of the part played in Korea by British Commonwealth Forces, from the outbreak of the conflict until July 1951.

As the author says in a note, no attempt has been made to tell the whole story of the campaign and the booklet is essentially the result of the notes and observations he made when he visited units of the Commonwealth Forces, during 1951.

The story is factually and vividly told; leaving out all the frills, a temptation to which he might easily have succumbed. This is to be expected, however, of an author of Mr. Linklater's caliber.

The booklet is well illustrated with a collection of excellent photographs and maps. The appendix provides a list of units which have taken part in the campaign.

This booklet is strongly recommended for those who wish to know the part played by units of the Commonwealth Forces in Korea.

ROMAN LAW: An Historical Introduction. By Hans Julius Wolff. 260 Pages. University of Oklahoma Press, Norman. \$3.75.

THE RISE AND FALL OF HERMANN GOERING. By Willi Frischauer. 309 Pages. Houghton Mifflin Company, New York. \$3.50.

THE CARIBBEAN COMMISSION. By Bernard L. Poole. 303 Pages. University of South Carolina Press, Columbia. \$5.50.

A study of co-operation among Great Britain, the United States, France, and the Netherlands in the West Indies.

HOW TO WRITE CLEARLY AND EFFECTIVELY. By Frank H. McCloskey. 274 Pages. Simon & Schuster, New York. \$2.95.

200 MILES UP. The Conquest of the Upper Air. By J. Gordon Vaeth. 203 Pages. Ronald Press Company, New York. \$4.50.

BY COL GEORGE C. REINHARDT, *CE*

This book is a readable account of frequently discussed but seldom understood features of modern scientific research. It furnishes a nontechnical audience with enough information to grasp the broader aspects of rocket and guided missile problems as well as their achievements. Little-known developments such as the "sky hook balloon," inexpensive tool of upper air investigation, and a sketch of the task involved in manned rockets to the moon appear, adequately simplified, alongside old acquaintances like the *V-1* and *V-2*.

Introduced, on the book's jacket, as an engineer engaged in research for the Navy, Mr. Vaeth not only spares us complicated scientific jargon, but keeps his feet on the ground in his forecasts; "The cost . . . upward of \$2,000,000,000 . . . is difficult to justify merely for the sake of flying to the moon . . . although there are valid scientific . . . and some military reasons" for the attempt.

NAPOLEON AND THE DARDANELLES. By Vernon J. Puryear. 437 Pages. University of California Press, Berkeley, California. \$5.00.

SURVIVAL: The Salvage and Protection of Art in War. By James J. Rorimer in collaboration with Gilbert Rabin. 291 Pages. Abelard Press, New York. \$4.00.

BIOLOGICAL EFFECTS OF EXTERNAL BETA RADIATION. Edited by Raymond E. Zirkle. 242 Pages. McGraw-Hill Book Co., New York. \$3.25.

NAVAL POWER AND TRADE IN THE MEDITERRANEAN. By Archibald R. Lewis. 271 Pages. Princeton University Press, Princeton, New Jersey. \$4.00.